THE IRISH NATURALIST:

A Monthly Journal

OF

GENERAL IRISH NATURAL HISTORY,

THE OFFICIAL ORGAN OF

The Royal Zoological Society of Ireland; The Dublin Microscopical Club;
The Belfast Natural History and Philosophical Society;
The Belfast Naturalists' Field Club; The Dublin Naturalists' Field Club;
The Armagh Natural History and Philosophical Society;
The Cork Naturalists' Field Club; The Limerick Naturalists' Field Club.

EDITED BY

GEORGE H. CARPENTER, B.Sc., Lond.

AND

R. LLOYD PRAEGER, B.A., B.E., M.R.I.A.

VOL. III.

DUBLIN: EASON & SON, Limited,
85 MIDDLE ABBEY STREET, and 40 LOWER SACKVILLE STREET;
BELFAST: 17 DONEGALL STREET.
LONDON: SIMPKIN, MARSHALL, HAMILTON, KENT & Co., Ltd

1894.

PRINTED BY ALEX. THOM & CO. (LIMITED), 87, 88, & 89, ABBEY-STREET, DUBLIN.

CONTRIBUTORS

TO THE PRESENT VOLUME.

—:o:—

Rev. John Andrew, Belfast.
Miss M. K. Andrews, Belfast.
V. Ball, c.b., ll.d., f.r.s., Dublin.
G. E. H. Barrett-Hamilton, New Ross.
Arthur Bennett, f.l.s., Croydon, Surrey.
Jas. Bennie. Geol. Survey, Scotland.
Ernest Bennis, Limerick.
Jas. Brandreth, Dublin.
Rev. S. A. Brenan, b.a., Cushendun.
D. C. Campbell, Londonderry.
W. Howard Campbell, Londonderry.
G. H. Carpenter, b.sc., Dublin.
N. Colgan, m.r.i.a., Dublin.
A. J. Collins, Belfast.
Miss Louisa E. Cuppage, Trim.
H. K. Gore Cuthbert, Blackrock.
J. E. Duerden, a.r.c.sc., Lond., Dublin.
G. P. Farran, Templeogue, Co. Dublin.
Rev. W. W. Flemyng, m.a , Coolfin.
Rev. Hilderic Friend, f.l.s. Cockermouth.
J. N. Halbert, Dublin.
H. C. Hart, b.a., f.l.s., Letterkenny.
J. Hunter, Woodenbridge.
H. Lyster Jameson, Killencoole, Co. Louth.
Rev. W. F. Johnson, m.a., f.e.s., Armagh.
J. H. Johntson, Armagh.
W. F. de V. Kane, Drumreask, Co. Monaghan.
G. H. Kinahan, m.r.i.a., Dublin.
Rev. H. W. Lett, m.a., Loughbrickland.
H. C. Levinge, d.l., Knockdrin, Co. Westmeath
Rev. E. F. Linton, m.a., f.l.s., Bournemouth.
C. Longfield, Enniskeen, Co. Cork.
David M'Ardle, Dublin.
R. M'Clean, Sligo.
W. MacMillan,Co. Wexford.
Rev. E. Mawley, Berkhampstead.
C. B. Moffatt, Ballyhyland, Co. Wexford
Prof. J. P. O'Reilly, c.e., Dublin.
J. E. Palmer, Dublin.
Robert Patterson, f.z.s., Belfast.

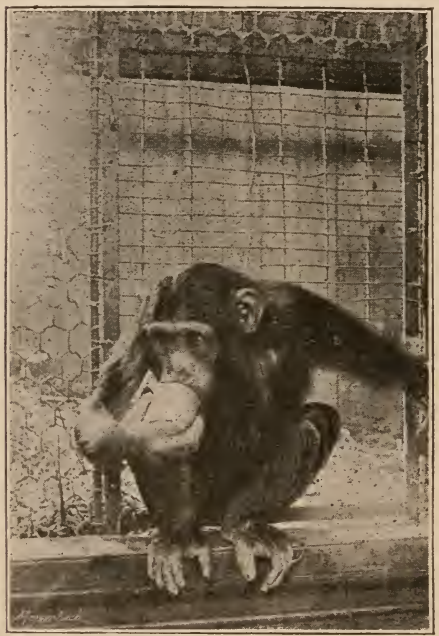
R. Lloyd Patterson, J.P., F.L.S., Belfast.
W. H. Patterson, M.R.I.A., Belfast.
W. H. F. Patterson, Belfast.
R. A. Phillips, Cork.
Greenwood Pim, M.A., F.L.S., Dublin.
R. Lloyd Praeger, B.E., Dublin.
W. E. Praeger, Keokuk, Iowa.
T. Mellard Reade, C.E., F.G.S., Liverpool.
Miss Harriette E. Reynell, Dublin.
R. F. Scarff, B.Sc., Ph.D., Dublin.
Reginald Scully, F.L.S., Dublin.
W. E. Sharp, Ledsham, Cheshire.
W. A. Shoolbred, M.R.C.S., Chepstow.
W. Sinclair, Strabane.
J. Crosbie Smith, Monkstown, Co. Cork.
Prof. W. J. Sollas, LL.D., F.R.S., Dublin.
R. Standen, Manchester.
James Stelfox, Belfast.
S. A. Stewart, F.B.S.E., Belfast.
H. J. Synott, Dublin.
Miss M. Thompson, Cork.
Miss S. M. Thomson, Belfast.
Brockton Tomlin, Llandaff.
R. J. Ussher, Cappagh, Co. Waterford.
Rev. C. H. Waddell, B.D., Saintfield.
C. W. Watts, F.I.C., London.
R. Welch, Belfast.
E. Williams, Dublin.
Williams and Son, Dublin.
J. J. Wolfe, Skibbereen.
R. M. Young, B.A., M.R.I.A. Belfast.

ERRATA.

Page 159, at beginning of line 1, insert May 17th.
,, 222, line 27, for "*Lygus*," read "*Stygnus*."

INDEX.

—:o:—



"JOHNNIE,"

CHIMPANZEE AT ZOOLOGICAL GARDENS, DUBLIN.

Received at Gardens, 26th April, 1890; died, 26th November, 1893.

From a Photograph by Professor Birmingham, M.D.; taken October, 1892.

The Irish Naturalist.

VOL. III. JANUARY, 1894. No. 1.

THE LIFE AND DEATH OF JOHNNIE, CHIMPANZEE.

LATE OF THE ZOOLOGICAL GARDENS, DUBLIN.

BY V. BALL, C.B., LL.D., F.R.S.

IN the Report of the Royal Zoological Society of Ireland for 1889 we find the following passage:—"It is with very great regret that we have to record the death of the Orang-utan "Sindbad," on the 7th of April last. He had been purchased in August, 1885, and during his three years and eight months of residence in the Gardens was a universal favourite with all visitors, while his engaging character secured for him the affectionate regard of all who were more intimately acquainted with him"—then follows in the same report a more detailed account.

It was a case, or nearly so, as it always should be in a Zoological Gardens, of "*le roi est mort, vive le roi*," for in 1890, in the same month as the Orang died the Gardens received a donation of a young Chimpanzee from Mr. Cross, of Liverpool, with whom many transactions in the way of buying and selling animals have taken place.

If any reader seeks for a scientific disquisition on the Chimpanzee he is advised to pass over these pages, and refer to some of the regular text-books; here we intend only to speak of him as we might of a more or less respectable citizen, lately deceased, or as the representative of a race of which, in the orthodox fashion, we propose to describe the manners and customs—it may be at once admitted that he had several of each—more particularly the latter. His moral character was such that we propose to say no more about it than what is at the same time pleasant and instructive—as is sometimes done with great effect in other biographies, on the principle "*de mortuis nil nisi bonum*."

Johnnie was taught the gentle art of drinking-milk through-a-straw by the keeper Supple, who relates that he first tried him with the stem of a clay pipe, which soon got broken; then a quill was tried, but Johnnie hurt his gums with it. Next Supple, taking a sound-looking straw, and having removed the knots, presented it to Johnnie, who forthwith sucked up a tumblerful of milk with it, and, moreover, having watched the preparation of the straw, soon afterwards began to prepare straws for himself by biting off the knots and sucking through them to see if they were free and drew well. When he had thus prepared a good one, he would hide it away till it was wanted. We have often seen him take a prepared straw from its hiding-place, when he knew by the presence of visitors, or other well-known indications, that he was about to be given a glass of milk—or what he liked better, perhaps, a glass of porter or of Parrish's food.

His ordinary demeanour was grave and dignified, and he often regarded his visitors with an air of condescending patronage; when suddenly with a wild whoop, as though he felt that "*dulce est desipere in loco*," he would seem to fling his dignity aside, like the legal or ecclesiastical personages of burlesque, and proceed to execute a number of somersaults—a performance by which poor Johnnie, like our street Arabs, earned many a reward such as he loved. His tumbles were accompanied by much thumping and noise, so as to ensure proper attention being given to him by his audience. In fact Johnnie was horribly jealous of attention being shewn to the occupants of neighbouring cages. Often his thumps and indignant protests might be heard—for instance, when on Saturday a party of the Council remained, in his opinion, too long in the outer room inspecting the lion cubs and cheetahs.

For some months back Johnnie's gambols and light-hearted manifestations of delight on the arrival of visitors have become less and less; and Supple has deplored his loss of appetite and his consequent loss of flesh. Often has the writer been invited to feel his spinal column, and to suggest some remedy for the alarming loss of flesh which its sharpness indicated.

Some said that one thing, some that another, was required to restore him to health and strength, but one nostrum, shall we call it, seemed to prevail beyond all others, and that was that Johnnie should be supplied with a wife; indeed several who had tried

the experiment themselves went so far as to predict a long and happy future for Johnnie if he were provided with the one thing needful—a loving and affectionate mate.

The resources of civilization being called upon, proved nearly, but, alas, not quite equal to the occasion, for in response to a demand, a lady chimpanzee indeed soon arrived from across the seas, but her extreme youth seemed to be an effectual bar to the accomplishment of the project for the present.

When the state of affairs was mentioned to Johnnie (although to be strictly veracious we must admit that he *said* absolutely *nothing*), still, having assumed to some extent the manners of the country of his involuntary adoption, he looked so to speak, two severe notes of interrogation (??) one following the other. Those competent to interpret his meaning assure us that the first meant "*Do you take me for a Hindu?*" and the second, "*Do ye think I'd be bothered with a brat like that?*"

Thus was the cup of disappointment filled to the brim for those who had expected such joyful results. They turned on the dealer in beasts, who had sent over the infant, and he on his part retorted with a charge of base ingratitude—"You asked," he said, "for a lady Chimpanzee, and I, being anxious to gratify you, obtained one with enormous trouble, &c., &c., and have not earned a penny by the transaction."

The infant was sick for some time after arrival, but she is now well and hearty, while as for poor Johnnie, we last saw him alive on Saturday the 25th November, for on the following day, Sunday, the 26th, he died, thus completing a residence of exactly three years and seven months in the Gardens, or almost the same period as that which his predecessor the Orang-utan lived there.

The post-mortem which was made on Johnnie's body by Dr. Cunningham has established the fact that he died of consumption, so that it is probable that his life could not have been prolonged by any other treatment than that which he received.

Since his death many of his friends and admirers have only became aware of the fact when they missed him from his place. One special admirer, who weekly presented him with bananas and Parrish's food, had not, at the time this was written, visited the gardens since his death.

It will be of some interest to see the results of the taxidermist's art in attempting to reproduce Johnnie as we knew him. A niche of honour is reserved for his stuffed remains in the Council Room at the Gardens.

The accompanying illustration (Plate 1), which represents him in a characteristic attitude, is from a photograph by Dr. Birmingham, to whom we are indebted for permission to reproduce it.

THE IRISH WOOD-LICE.

(WITH DESCRIPTIONS AND FIGURES OF ALL THE BRITISH SPECIES.)

By R. F. Scharff, Ph.D., B.Sc.

Everyone knows what wood-lice are, although the name is not very happily chosen, or correctly descriptive, since the animals so-called are not lice, nor do they generally live in wood. They are crustacea, but differ chiefly from the rest of the class to which they belong in the manner in which respiration is effected. On the under side of the tail, which is often short and inconspicuous, are a number of delicate membranous plates, which look very much like the branchia or gills found in the aquatic crustacea, but are not, like them, fit for performing the office of respiration in water. Instead of acting as gills, some of these plates have been transformed into a very rudimentary kind of lungs, their interior being furnished with canals or passages into which the atmospheric air penetrates by means of minute orifices. They thus perform the same function as the spiracles in insects. The seven pairs of legs attached to the underside of the body are usually so much alike in size and shape that the wood-lice, along with many allied crustacea living in water, have been placed among the Isopoda (equal-footed crustacea). The head, as in other crustacea, is provided with two pairs of feelers or antennæ, but the lower pair are so minute in the terrestrial species of Isopoda as to be scarcely visible. All the Irish wood-lice, except one, have well-developed compound eyes fixed at the sides of the upper surface of the head. One species, however *(Platyarthrus Hoffmanseggii)*, is quite blind, and spends its entire existence in the nests of ants, where it acts probably as scavenger, and is, therefore, allowed to remain. But these

blind wood-lice are not adopted as one of the family, as the ants, when disturbed, do not carry them out of danger, but let their guests shift for themselves.

The female wood-lice are provided with a series of large membranous plates at the base of the legs. These plates lie in a horizontal position and overlap one another, so as to form a kind of pouch within which the eggs are lodged during incubation, and the young are retained there for some time after they are hatched.

One species, *Armadillidium vulgare*, owing to its round tail, is able to roll itself into a perfect ball, and looks in this condition very much like a black pill. Whether this fact has given rise to the belief that this wood-louse has strong medicinal qualities I cannot tell, but it was certainly in great favour formerly as a remedy for indigestion. Some species try to roll themselves up when alarmed, but the appendages at their tail seem to be rather in the way, and prevent them from effectually performing this evolution. Other species, like *Philoscia* and *Trichoniscus*, when alarmed, feign death, and lie perfectly still on their backs in the hope of thus escaping unobserved.

Wood-lice are all of retiring habits, and they always live in damp situations, as the air they breathe must be saturated with moisture to keep the gill-like breathing organs in working order. It is for this reason that Ireland, poor as is its fauna in many respects, can boast of a large number of species, the climate being quite an ideal one for their general comfort. None of the species have, like their near relations the shrimps, crabs, and lobsters, tempted mankind to search for them as food, and they have, therefore, remained in a happy state of obscurity. Most of them only venture out at night, whilst during the day-time, especially in dry weather, they remain secluded under stones or in worm-burrows.

They must be put down as distinctly injurious animals to the gardener. In the green-house they lurk in immense numbers about the bottom of flower-pots. There they eat the tender tips of the roots, or, emerging at night, climb the plant and feast on the young leaf-buds. In a fernery they are especially destructive, as the damp which suits ferns is also adapted to their requirements, and often some species of ferns never get a chance of developing their fronds, unless saved by

a persevering use of traps. In the economy of nature, however, they seem to be serviceable by eating decaying substances.

The late Prof. Kinahan, of Dublin, was one of the highest authorities on wood-lice, and has published a number of valuable papers on these and other groups of crustaceans, to which I shall have occasion to refer again. Mr. Hogan, Prof. E. P. Wright, and Mr. Haliday have all rendered useful services in making the knowledge of Irish wood-lice more complete. Much still remains to be done, however, and we are still far from having obtained a thorough knowledge of the exact distribution of the various species in Ireland. I have now pleasure in announcing the addition of three species to the Irish list. There are altogether seventeen British species of wood-lice, all of which are figured in a separate plate which will appear with next number. Of these twelve are common to Great Britain and Ireland, two are found in Great Britain and not in Ireland, and three in Ireland and not in Great Britain, so that the fauna of Ireland, though poorer in many respects than that of Great Britain, is richer in wood-lice by one species. The Irish species may be conveniently divided into three families, viz., *Ligiidæ*, *Oniscidæ*, and *Armadillidæ*.

In the nomenclature I have adhered almost altogether to the monograph of the "Crustacea Isopoda Terrestria," by Prof. G. Budde-Lund, of Copenhagen, who has kindly determined some of the species for me, and confirmed the identification of those not hitherto recorded for Ireland. I have also to acknowledge the kind assistance I received from Mr. A. Dollfus, of Paris, whose valuable papers on terrestrial isopods I have had frequent occasion to refer to.

In drawing up this list of the Irish wood-lice, I have been assisted with specimens by the Committee appointed by the Royal Irish Academy to investigate the Irish Fauna and Flora, and by Messrs. G. H. Carpenter, H. L. Jameson, J. N. Halbert, W. F. de V. Kane, A. R. Nichols, Dr. M'Weeney, and Mr. R. Welch.

The following is a list of some of the more important papers and works which have been published on the subject, and of works bearing on the geographical distribution of the species in the British Isles :—

1. BATE (C. SPENCE) & WESTWOOD, S.O.
History of British Sessile-Eyed Crustacea, vol. ii., 1868.
2. BUDDE-LUND, G.
Crustacea Isopoda Terrestria. 1885.
3. HOGAN, A. R.
On a new British Oniscoid found in Ants' Nests.
Natural History Review, vol. vi. 1859.
4. DOLLFUS, A.
Catalogue raisonné des Isopodes terr. de l'Espagne.
Anal. de la Soc. Esp. de Hist. Nat., vol. xxi. 1892.
5. KINAHAN, J. R.
Analysis of certain allied genera of Terrestrial Isopoda.
Natural History Review, vol. iv. 1857.
6. KINAHAN, J. R.
On the genera *Philoscia*, *Itea* and *Philougria*.
Natural History Review, vol. v. 1858.
7. KINAHAN, J. R.
On the genus *Platyarthrus*, &c.
Natural History Review, vol. vi. 1859.
8. NORMAN, A. M.
Note on the discovery of *Ligidium agile*, Persoon, in Great Britain.
Ann. and Mag. Nat. Hist. (4), vol. xi. 1873.
9. SCOTT, Th.
The Land and Freshwater Crustacea of the District around Edinburgh.
Proc. Royal Phys. Soc. of Edinburgh, vol. xi. 1890-91.
10. STEBBING, T. R. R.
History of Crustacea, 1893.
11. STEBBING, T. R. R.
On a Crustacean of the Genus *Zia*.
Ann. and Mag. Nat. Hist. (4). vol. xi. 1873.
12. THOMPSON, W.
Natural History of Ireland. vol. iv. 1856.

To those who wish to send me wood-lice for identification, I would urge the importance of putting them at once into spirit. The bottle should contain a little cotton-wool to prevent the specimens from injury by being shaken about.

(TO BE CONTINUED.)

Our New Cover.—We would draw the attention of our readers to the new cover which is issued with the present number, and which will in the future replace the plainer wrapper that heretofore enclosed the *Irish Naturalist*. This artistic and appropriate design is the work and the gift of Mr. John Vinycomb, M.R.I.A., ex-President Belfast Naturalists' Field Club, whose name is well known in artistic circles, especially in connection with heraldic art. It will be observed that the various items of the design are essentially representative of Irish Natural History, and that they are, moreover, figured with strictly scientific accuracy. The skull and antlers of the Irish Elk are carefully reproduced from a fine specimen in the Science and Art Museum, Dublin; the plant whose blossoms are gracefully interwoven with the initial letter of the title is *Saxifraga geum* (which is in Britain confined to S.W. Ireland), drawn from a specimen collected in Co. Cork by Mr. Praeger; the mollusc which crawls along the bottom of the page is recognisable at a glance as the celebrated Kerry Slug (*Geomalacus maculosus*), from a sketch from life by Dr. Scharff; and the hovering insect is the Galway Burnet Moth (*Zygæna nubigena*), from a drawing by Mr. Carpenter: in Britain it is found only in Galway and the Scottish Highlands. The title of the magazine, picked out in Celtic characters, appropriately completes the design.

NOTES ON THE DUBLIN FLORA.

BY R. LLOYD PRAEGER, B.A., M.R.I.A.

Mr. Nathaniel Colgan's remarks on the flora of County Dublin, recently published in this Magazine[1], are of considerable importance to local observers, and have, no doubt, been read with interest by botanists throughout Ireland. While the writer's remarks on the history of Dublin botany are concise and instructive, and while his lists of new or rare species form a valuable contribution to our knowledge of local plant-distribution, decidedly the most important feature of the paper is the announcement that the writer is actively engaged on the compilation of a Flora of County Dublin, on which, by his own statement, he has been hard at work for the last two years. With what painstaking care and accuracy Mr. Colgan will carry out the task which he has undertaken, those who have read his several communications to the *Irish Naturalist* can judge; as can the present writer also, from the experiences of several pleasant days spent in botanizing in the home county with his friend, the author of the forthcoming Flora of Dublin. While we must congratulate ourselves that the laborious work of gathering together material for the new Flora is already so far advanced, it is at the same time to be regretted that Mr. Colgan has not earlier made public a scheme which is of such general interest. At last, however, Mr. Colgan has issued an invitation to his brother botanists (howbeit only in a foot-note) to assist him by transmitting notes (and specimens, no doubt) of rarer plants observed in the county. This is only as it should be; for there are many botanists in Dublin, some of them possessing a long and intimate acquaintance with the surrounding district; and among them there must be information respecting the local flora which it would take a single observer many years to acquire, if, indeed, it could now be acquired; it is to be hoped that all such information will be freely tendered to Mr. Colgan. Naturalists will judge the local flora, and also the industry and observation of the custodians of that flora—the local botanists—by such accounts as may be available; and it behoves the Dublin botanists to make the forthcoming account of their flora as comprehensive, as detailed, and as accurate as is possible.

[1] *Irish Naturalist*, Nov., 1893.

Dublin County is botanically interesting in several respects. The flora is decidedly a rich one—as floras go in Ireland; witness the number of species enumerated in Mr. Hart's "Flora of Howth." As the result of a season's rambling in County Dublin, following on a somewhat intimate acquaintance with the flora of Antrim and Down, the present writer has been struck with the fact that while there is hardly a plant of common occurrence in the latter portion of Ireland that is not equally common in County Dublin, there are in Dublin quite a number of common species which we have been accustomed to reckon as rarities or desiderata in the North-east. Such, for instance, are *Ranunculus circinatus*, *Galium mollugo*, *Dipsacus sylvestris*, *Erigeron acris*, *Senecio erucifolius*, *Tragopogon pratensis*, *Thrincia hirta*, *Leontodon hispidum*, *Crepis taraxacifolia*, *Galeopsis ladanum*, *Orchis pyramidalis*, *Glyceria aquatica*, *Bromus erectus*, *B. sterilis*, *Hordeum murinum*; but it is to be noted that some of these are plants of the limestone plain, and are to be found in equal abundance from Dublin to Galway, and from Fermanagh to Cork; and that others occur plentifully over the southern half of Ireland. Perhaps the most characteristic feature of the Dublin flora, certainly the one which first strikes a comparative stranger, is the number of plants of various degrees of naturalization—colonists, denizens, waifs—which it contains. What an interesting paper Mr. More or Mr. Colgan could give us on the casuals of County Dublin; only the other day Dr. Percival Wright told me quite a botanical fairy story of strange flowers which he and the late Canon Grainger used to collect in years gone by down at the North Lots, where their appearance was, no doubt, intimately connected with the import trade at the docks. Even as it has been historically, so botanically, Dublin appears to have been for invaders a convenient landing-place in Ireland. Some of these new-comers have been mere phytological nomads, springing up unexpectedly for a season, and vanishing as rapidly as they came. Such apparently were *Alyssum calycinum*, *Medicago maculata*, *M. denticulata*, *Centaurea paniculata*, *C. solstitialis*, *Atropa belladonna*, and other species; while in Appendix III. of his "Flora of Howth," Mr. Hart gives a list of most unexpected exotics found in that neighbourhood. In this category may also be placed a peculiar group of aliens which Mr. M'Ardle and I found last season in

a gravel-pit near Clontarf, and which included *Bunias orientalis*, *Sisymbrium loeselii*, *Silene armeria*, *Anacyclus radiatus*; and the curious grass *Lolium repens*, f. *cristatum*, gathered near Glasnevin.

Some other plants appear to have secured a firm hold in the immediate vicinity of Dublin, but have not, yet at least, ventured further afield. Note the abundance of *Mercurialis annua*, which chokes the city back-gardens and rubbish-heaps, yet vanishes as soon as we get clear of the houses and smoke of the town. The Mercury, however, has established itself in one or two spots in the South of Ireland, and a better illustration is furnished by the rare *Sisymbrium irio*, which grows abundantly in the Dublin suburbs, and is unknown elsewhere in Ireland. One or two other plants, on the contrary, which are quite recent arrivals in Ireland, have been rapidly spreading since they took up their abode with us. Two excellent examples are furnished by *Diplotaxis muralis* and *Linaria minor*, both of which, it is to be remarked, select railway tracks as their favourite abode.

Diplotaxis was first found at Portmarnock in 1837, and rapidly increasing, is reported as abundant at Portmarnock and Baldoyle in "Cybele Hibernica" (1866). More recently it is recorded from Howth[1] and Sutton[2]; and last season I found it abundant on the railway from Amiens-street to Howth Junction, a distance of five miles, and recorded its spread to Skerries and away down into County Armagh.[3] *Linaria minor* has a similar history. Mackay, in "Flora Hibernica," remarks that he has not seen an Irish specimen, but that the plant is reported to grow in County Cork. In "Cybele" is published its first County Dublin station—Stillorgan; the "Guide to County Dublin" adds Sydney Parade and the M.G.W. Railway; Mr. Hart adds Howth; and last season Mr. Colgan noticed it on the railway from Clontra to Bray River, and the writer found it along the same line the whole way from Harcourt-street to Bray, and also at Wicklow and Rathnew.

The additions to the flora of County Dublin, and additional stations for rarer species published in Mr. Colgan's paper, give ample proof of the zeal with which the author is exploring the

[1] "Guide to County Dublin," 1878. [2] "Flora of Howth," 1887.
[3] *I.N.*, 1893.

recesses of the district in quest of botanical information. But here one cannot help wondering whether the rambles of many years on the part of other local observers may not have resulted in similar discoveries which might fitly have found a place here, and whether a critical examination of the herbaria and the memories of a few of his fellow-botanists might not have furnished some additions to the list. I write with no personal motive, for my own acquaintance with the Dublin flora is very limited, being merely the result of a single season's casual botanizing; nevertheless I may, perhaps, not inaptly bring these desultory remarks to a close by the addition of such notes as I have of a few rarer plants observed in the county during the past season, as a small contribution towards the new Flora.

† **Fumaria pallidiflora**, Jord.—Cultivated ground at Dundrum and Stepaside.

* **Malva moschata**, L.—In some abundance in a meadow near Old Bawn, below Bohernabreena. This plant is extremely rare in Co. Dublin, and doubtfully native. Howth and Templeogue appear to be the only previous records. In the present instance, the occurrence of *Trifolium hybridum*, *Medicago sativa*, and *Cichorium intybus* in the same meadow point to its introduction with the grass-seed; it remains to be seen if it will establish itself.

Trifolium medium, L.—Kelly's Glen, Dublin Mountains.

‡ **Prunus cerasus**, L.—In hedges near Gormanstown, in the extreme north of the county.

Rubus.—I have before me, as I write, a list of nineteen different *Rubi*, as determined by Mr. Moyle Rogers, collected last season in various portions of the county. The Brambles have been severely let alone by all previous observers in this part of Ireland, Dr. Moore alone excepted; and even Mr. Hart's "Flora of Howth," in most respects so complete, contains merely a reference to four forms. In consequence, all on my list given below, with two exceptions (marked *), are new to the county, and to district 5:—*R. rhamnifolius*, *R. nemoralis* var. *pulcherrimus*, **R. rusticanus*, *R. silvaticus*, *R. macrophyllus*, and var. *Schlectendalii*, *R. pyramidalis*, *R. leucostachys*, *R. mucronatus*, *R. echinatus*, *R. scaber*, *R. fuscus*, *R. rosaceus* var. *hystrix*, *R. dumetorum* var. * *scabrosus*, *R. coryllifolius* and var. *sublustris* and var. *conjungens*, *R. coryllifolius* x *rusticanus*, *R. Balfourianus*. I hope to give details of the distribution of these and other Irish *Rubi* in an early number of the *Journal of Botany*.

Carduus crispus, L.—By the shore below Raheny; at Balbriggan, and in the grounds of Gormanstown Castle[1].

†**Matricaria chamomilla**, L.—In a gravel-pit at Clontarf. Previously recorded from Baldoyle and Howth; very rare in the county, and apparently not yet established, as it is, for instance, in Antrim.

Echium vulgare, L.—Abundant in a dry field near Gormanstown Castle, nearly two miles from the sea; seldom met with inland.

---

[1] Gormanstown Castle is in Meath, just over the county boundary, but its extensive grounds lie chiefly in County Dublin.

Stachys ambigua, Smith (*S. sylvatica* x *palustris*).—Shady roadside north of Balscaddan, close to the county boundary. Appears to be the true *S. ambigua;* as remarked in Hooker's "Student's Flora," other hybrids nearer to *S. palustris* are more common.

Stachys arvensis, L.—About the railway at Foxrock. Howth (*Flor. Howth*) is the only previous Dublin record.

Polygonum aviculare, L. var. **arenastrum** (*fide* A. Bennett).—Sandy shore north of Balbriggan, with *P. Raii.*

Ophrys apifera, Huds.—In some abundance in meadows by the sea between Ballybrack and Bray, R. Ll. P. 13th July, 1886. (This is the only note which does not refer to the past season.)

Carex riparia, Curt.—In a pool by the railway between Clontarf and Raheny.

It may not be out of place to refer here to a scheme recently set on foot for the compilation of a Cryptogamic Flora of County Dublin. The cryptogams are so numerous, and most of them are so minute, and require such careful study, that the proposed cryptogamic survey of the county can be carried out only by the combined investigations of a number of botanists. We are fortunate in having in Dublin naturalists well qualified for the work, and whose active interest in the Irish flora is already well known. Mr. Greenwood Pim and Dr. M'Weeney, who have already done so much for Irish mycology, have undertaken the Fungi. The mosses and hepatics will be in the hands of Mr. M'Ardle. The marine Algæ will be well looked after by Prof. Johnson, and Mr. F. W. Moore has kindly promised assistance in the difficult group of the fresh-water Algæ. No doubt fresh recruits will come forward as the work proceeds; and with the addition of the information that has been already placed on record, it is hoped that in a few years time it will be possible to publish at least a first contribution to a Cryptogamic Flora of Dublin. In the meantime, any of the gentlemen named, or the present writer, will be very pleased to hear from any one who is willing to assist in the large amount of field work which still remains to be accomplished.

A WALK ALONG THE GLACIAL CLIFFS OF KILLINEY BAY.

BY PROFESSOR W. J. SOLLAS, LL.D., F.R.S.

A WEEK before Christmas Mr. Praeger and I found ourselves starting for a ramble along the shore from Bray to Dalkey. A sunshiny day, with sun and clouds making one glory over the headland of Bray behind us, and another over the shining hills of Dalkey in front. The open sea, with its waves breaking in creaming foam upon the strand, made us think for very contrast of Archangel and its ice-bound port, while the open sky, with mere remnants of riven clouds, turned our thoughts to London, with its sad and mournful canopy of smoke: and we were thankful; so, for our climate, a Dublin geologist should ever be, but especially on a Sunday afternoon.

We scrambled over the clean-washed pebbles of the piled-up beach by the mouth of Bray River, finding much of interest and beauty in them, and so reached the low line of cliffs which extends nearly all the way from Bray to Dalkey. The change from the pebbles to the cliff-foot is marked, for the latter is formed of a stiff resistant reddish clay on which walking is sure and easy. This is the famous boulder clay, and in the cliffs before us it can be traced upwards for 12 feet at least; it is succeeded by a marvellously irregular patchy series of sand and gravel, which we may call "contorted drift," and this is followed by coarser beds more horizontal and more regular, full of great blocks of stone; these we shall call for the nonce "gravelly boulder beds." Thus in descending order we have the following succession :—

Gravelly Boulder Beds.
Contorted Drift.
Boulder Clay.

The distinction between these different deposits looks much clearer on paper than it is in reality; as one walks along the shore the cliffs seem to change in structure every few hundred yards; in one place the threefold division can be recognised at a glance; in another only two divisions are to be distinguished, the boulder beds and contorted drift then forming a single series of sands, gravels, and boulders; in other places thick beds of pebbles and sands sub-divide the boulder clay into several

members, and the whole appears to form a single series, with clay preponderating below and sand above, and in yet others confusion baffles classification, and reduces the observer to despair. The distinction between the contorted drift and the boulder beds is the least constant; these so generally pass into each other that if we give them separate names it can only be for our own convenience; the line between them and the boulder clay, however, can be more easily drawn, and is more persistent. The full value of its significance we may hope to ascertain when investigation has progressed further; at present our knowledge is surprisingly incomplete.

The boulder clay extends all the way from the mouth of Bray River to Killiney, but with frequent changes of level and with variable thickness. Sometimes its summit sinks below the level of the beach, sometimes rises 15 to 20 feet above it; its base is nowhere seen. Though usually red in colour, it is sometimes, especially in its upper portions, black, but even then, wherever water can percolate, as along the numerous cracks which traverse it, the black colour disappears, and is replaced by red; possibly, therefore, the red colour is not original.

Irregularly scattered through the clay are numbers of small stones, with here and there a larger one, sometimes gigantic by comparison, as in the case of one granite block which measured 3 feet in length. The stones are usually irregular in shape, and irregularly scratched, but not seldom a boulder with flattened faces and longitudinal striæ is to be seen. They commonly consist of the limestone of the district, though, as Dr. Scouler pointed out long ago, travelled boulders from the far north are frequently met with; thus, pieces of the hard chalk of Antrim, beautifully polished and finely scratched, are far from rare. That these are truly Antrim chalk may be proved by examining thin slices under the microscope, when the characteristic structure of this rock is seen in all its details.

But what is most remarkable about the boulder clay is its richness in shells and fragments of shells. The fragments are sometimes rounded, sometimes polished as perfectly as if by the hand of a lapidary, and sometimes scratched. The entire shells are either univalves or single valves of bivalves, most commonly of the northern species *Tellina balthica;* one specimen of *Tellina* was found with its natural colour as fresh as

the day on which its inhabitant abandoned this life, and a valve of *Lucina* was found still retaining its outer horny coat, the so-called "epidermis." A list of the species found in the boulder clay is given by Mr. Praeger at the end of this account.

Singularly hard and coherent as the boulder clay is, it readily breaks down into a fine mud on boiling in water; the impalpable material of which it chiefly consists (much of which is kaolin or China clay, and much finely divided carbonate of lime) may then be washed away from a residue of fine sand, which has the same general appearance as the sand of the contorted drift and gravelly boulder beds; it consists of fragments of minerals of different kinds, including quartz, which occurs as rounded grains, sometimes beautifully smoothed and polished to a gem-like lustre even when only one-fiftieth of an inch in diameter, and of little bits of shells, also rounded and polished.

The mode of formation of this remarkable boulder clay is by no means easy to discover. The scratched fragments of rocks, some of which have been brought from Antrim, sufficiently indicate the action of ice in some form or other. Ice has carried them and ice has scratched them. The rounded polished sand-grains and shelly fragments probably acquired their characters on a wave and wind-driven beach, from which they were transferred in some unknown way to the boulder clay. The species of well-preserved marine shells concur with the scratched stones in suggesting that the sea in which they lived and in which the boulder clay was deposited was cold.

The hardness and coherence of the boulder clay is puzzling when we consider that the bulk of it consists of a material which is usually soft and plastic to an extreme degree, but no doubt this character is connected with the presence of calcareous mud: not less puzzling is the source of the clayey material itself; it may have been borne along by streams issuing from glaciers, or have been melted out from stranding ice-rafts.

The sum of our conclusions would thus appear to be that the boulder clay was formed in an icy sea which was tenanted by northern species of molluscs, and that shelly sands from ancient beaches, and ice-borne boulders, brought from far and near, contributed to its formation.

The change from the boulder clay to the contorted drift marks some great change in physical conditions, the nature of which we cannot at present fathom. The false bedding of the lenticular masses of sand, the irregular disposition of the gravel, often against buried cliffs made of its own material, suggest frequently-changing currents, while the travelled boulders, often bearing scratches, and the included marine shells, seem to show that the currents were those of a sea still laden with ice.

The relations of the contorted drift to the boulder clay are frequently of a remarkable character; often narrow curving cracks, filled with the sand and gravel of the drift, penetrate the clay, isolating large lenticular masses of it two or three feet or more in length. Sometimes genuine boulders of boulder clay, many feet long and several feet thick, are to be seen lying well within the midst of the contorted drift. But most curious are the numerous pipes and irregular funnel-like hollows, sometimes with vertical sides for a part of their course, which extend downwards from the contorted drift into the boulder clay. These are now filled with the sand and gravel of the contorted drift, which in the upper part of the hollow lies in downwardly converging stream-lines, while in the lower part it is sometimes more or less horizontally stratified, or lies in concave layers like a pile of watch-glasses. These filled-up cavities are difficult to account for except on the supposition that the boulder clay at one time included in its mass great lumps of ice, and that as these melted away the overlying sands and gravels poured down, displacing the water, and filling up the resulting pit. That the melting and filling up were completed before the deposition of the gravelly boulder beds is shown by the undisturbed manner in which these lie over the down-streaming sand of the contorted drift.

Much of the contortion of the last-named deposit is of marvellous complexity. In a bed of sand not more than two feet in thickness one may occasionally see in a length of a dozen feet four or five folds, illustrating almost every type of mountain structure, from the simplest anticlinal to the completed overfold with its reversed faults, or overthrusts; and, smoothing off every irregularity, there will follow upon this another bed almost perfectly horizontal, and composed of successive horizontal layers.

Here, incomplete, we must leave this hasty account of our afternoon's walk. The half remains untold, and even from what we have described we can form no connected and consistent story; clear only does it appear that at the time these deposits which form its latest cliffs were accumulating, the Irish Sea was not in winter open, tossed with swift waves, as now, but ice-bound like the frozen regions of the north. Whether, however, a great glacier displaced its waters and filled its channel from side to side with massive ice as some would have it, or whether its waters still maintained their place, nay, even with extended depth and margins, but sealed under a thick layer of ice, like Hudson's Straits in winter, and traversed by fleets of icebergs sailing south in summer, these and other hypotheses we do not now touch; more facts are wanted before definite conclusions can be reached, and with facts so easily to be collected and ascertained, the wonder is that we have not more inquirers into this fascinating branch of science.

PALÆONTOLOGICAL NOTES.

(BY R. LLOYD PRAEGER.)

Boulder Clay.—The boulder clay is everywhere highly fossiliferous. The shells are almost invariably fragmentary; bivalves are much more abundant than univalves. Some of the fragments are highly polished on both sides, with all the edges rounded; a few are scratched; but the majority have sharp edges, and have not suffered very rough treatment, as is strikingly exemplified by the fact that in some cases the epidermis still adheres. The following is a provisional list of species observed:—

* (N.) *Ostrea edulis.*
— *Mytilus edulis.*
N. ,, *modiolus.*
Ext. N. *Leda pernula.*
(N.) *Lucina borealis.*
— *Cardium edule.*
— ,, *echinatum.*
(N.) *Cyprina islandica.*
(N.) *Astarte sulcata* (aggr.).
N. ,, *compressa*, var. *striata.*
(S.) *Tapes aureus?*
(N.) *Tellina balthica.*
— *Mactra subtruncata.*
(S.) ,, *solida?*
— *Saxicava rugosa.*
— *Corbula gibba.*
(N.) *Mya truncata.*
— *Turritella terebra.*
— *Buccinum undatum.*
— *Murex erinaceus.*
Ext. N? *Nassa*, sp.
N. *Balanus tulipa-alba.*

* (N.) signifies that the habitat of the species is somewhat northern, N. distinctly northern, (S.) somewhat southern; and Ext. extinct in British seas. The sign — signifies that the species is widely diffused both north and south of Britain.

Of the above, *Cardium edule*, *Tellina balthica*, and *Turritella terebra* occurred most frequently. Of *Corbula* and *Tellina* complete valves were obtained; one valve of *Tellina* has its rosy-red colour beautifully preserved. The one specimen of *Nassa* was complete; the species has not yet been determined; it is not recent British. Of *Lucina* and *Mya* the epidermis was still adhering.

Brown Boulder Clay (separated from the underlying mass of the Boulder Clay by a bed of gravel).—In this bed the shell-fragments attain their maximum, the clay being thickly studded with them. The species identified were—

(N.) *Ostrea edulis*.
N. *Mytilus modiolus*.
Ext. N. *Leda pernula*.
— *Cardium edule*.
(N.) *Astarte sulcata*, var *elliptica*.
(N.) *Cyprina islandica*.
(S.) *Tapes virgineus*.
(N.) *Tellina balthica*.
(N.) *Mactra solida ?*
— *Saxicava rugosa*.
— *Corbula gibba*.
(N.) *Mya truncata ?*
— *Turritella terebra*.
— *Buccinum undatum*.

Corbula was the only shell of which a complete valve was obtained. *Cardium*, *Tellina*, and *Turritella*, were, as before, the commonest species.

Contorted Drift.—The fauna of this bed was only very cursorily examined. Shell-fragments are frequent, but by no means so well preserved as in the boulder clay. *Cardium echinatum*, *Cyprina islandica*, *Tellina balthica*, and *Turritella terebra* were the only species identified, but further investigation will, no doubt, add largely to the list. *Cardium echinatum* and *Cyprina islandica* were found to occur also in the gravels that generally form the upper portion of these beds, and within a couple of feet of the top of the section.

THE HYMENOPTERA-ACULEATA OF COURTOWN, CO. WEXFORD.

BY H. K. G. CUTHBERT.

THE pretty village of Courtown is the centre of a district of considerable interest to entomologists. The great variety of the landscape, upland and lowland, the abundance of wood, and the extensive ranges of sand-hills which fringe the coast, are all favourable to the insect-hunter. Hence various rarities have from time to time been added to the aggregate of our local fauna by collectors in this region. The following list of Aculeate or stinging Hymenoptera is the result merely of a few days' collecting in August, '92, and a couple of weeks

in August, '93. For this reason it is far from being representative, even of the chief types of this branch of the order in the district, and many genera and species are unrecorded which would certainly be met with, granted greater diligence, longer time, and an earlier season.

FORMICIDÆ.

(SOCIAL ANTS.)

Lasius niger, L.—Common at various points on or near the shore.

L. flavus, De G.—Very common on the sand-hills.

Myrmica scabrinodis, Nyl.—Abundant. Males and females in great numbers on fruit trees, especially plums.

FOSSORES.

(SAND AND WOOD WASPS.)

Ceropales maculatus, Fab.—Fairly common on flowers of wild Carrot at Seafield.

Pompilus plumbeus, Fab.—Common on the sand-hills at Courtown and Glascarrig.

P. gibbus, Fab.—Fairly common on clay banks at Cahore and Kiltennell.

Tachytes pectinipes, L.—Rare. A single specimen on a clay bank near Duffcarrick.

Pemphredon lugubris, Fab.—Common on Lilac at Courtown.

P. unicolor, Latr.—Also common. Usually occurs on the Sloe.

P. lethifer, Shuck.—Frequent on Sweet-briar and Wild Rose.

Mellinus arvensis, Fab.—Common everywhere near the sea. Females usually stalking *Muscidæ* and *Syrphidæ* on Ragwort; males on trees, especially Sycamore.

Crabro cephalotes, Panz.—Pretty common. Occurs not rarely along the east coast between Clogher Head, co. Louth, and Cahore Point, and probably further south.

C. leucostoma, L.—On laurels at Courtown and Kiltennell; not uncommon.

C. peltarius, Schr.—Not common. Taken near Cahore.

VESPIDÆ.

(SOCIAL WASPS.)

Vespa vulgaris, L.—Very common all over the district. The summer of 1893 was unusually favourable to these pests.

V. rufa, L.—Not common. One nest at Seafield.

EUMENIDÆ.

(SOLITARY WASPS.)

Odynerus parietum, L.—Not common in the district. This species is very abundant throughout co. Dublin.

O. trimarginatus, Zett.—I got three examples of this rather scarce species on flowers of Wild Sage at Seafield.

ANTHOPHILA.

(BEES.)

Colletes fodiens, Kirb.—Rare. One female taken from a clay bank overhanging the cliff at Glascarrig.

C. Daviesana, Sm.—Scarce. A small colony in a cutting at the Courtown brick and tile works.

Halictus rubicundus, Ch.—Very common in the district. Males on hawkweeds, females on Ragwort.

H. cylindricus, Fab.—Fairly abundant, males especially, on thistles.

H. villosulus, Kirb.—Not common. Taken at Glascarrig and Ballymoney.

H. minutus, Kirb.—Rare. Occurred at Ballygarrett.

H. nitidiusculus, Kirb.—Not common. Taken at burrows at Seafield and Pollduff.

H. tumulorum, L.—Pretty common, males at least. I was unable to find any of the burrows of this and the next species.

H. morio, Fab.—Also fairly abundant. Usually on hawkweed, Marsh Marigold, and thistle.

Andrena albicans, Kirb.—Abundant at Seafield and Ballymoney, chiefly on bramble.

A. Wilkella, Kirb.
A. Trimmerana, Kirb. } Common throughout the district.

A. nitida, Fourc.—Rare, taken at Kilmurray.

A. fucata, Sm.—Rare. One female at Ardamine and one on Taragh Hill. I have also taken this species at Skerries, Co. Dublin.

Nomada alternata, Kirb.—Fairly abundant. The commonest of its genus in the district.

N. flavoguttata, Kirb.—Rare. At burrows of *Andrena albicans* at Ballymoney.

N. bifida, Thoms.—Rare. Taken at Pollshone.

N. ruficornis, L.—Fairly common. This pretty "cuckoo" bee seems to be parasitic mainly upon *Andrena Trimmerana*.

Megachile centuncularis. L.—Common in the district in gardens. Also about Wild Roses at Kilmurray and Kilbride. Burrows frequently met with in Courtown Woods.

Bombus terrestris, L.
B. muscorum, L. } Very common and abundant.
B. hortorum, L.

B. lapidarius, L.—Very abundant. The commonest bee in the district. Its nests are most common in sandy banks, usually deserted rabbit burrows.

B. sylvarum, L.—Not common. In Courtown and Owennavarragh Woods.

I found an empty nest of *Vespa norvegica* in a small pine-wood at Kiltennell, but I did not meet with the insect. No species of *Osmia* occurred, but I discovered at Pollshone a number of clay cells attached to a stone in the cliff, which I think referable to one of these "mason" bees, perhaps *Osmia rufa*. For the determination of some of the more obscure species I am indebted to the kindness of Mr. Edward Saunders, F.L.S., the well-known authority on this order, and Mr. G. H. Carpenter; and my best thanks are hereby tendered to both these gentlemen.

PROCEEDINGS OF IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent donations comprise four Peregine Falcons, from R. M. Barrington, Esq.; a Sparrow-Hawk, from R. P. Jacob, Esq.; a Guinea-Pig, from Master G. H. Mitchell; and a Three-banded Douroucouli, from Dr. R. E. Griffin. Two Glossy Ibises, two Night Herons, and two Mandarin Ducks have been acquired by purchase.

The collection has sustained a loss in the death of the male Chimpanzee. A notice on this animal by Dr. V. Ball, accompanied by a photograph, appears in our present issue.

3,650 persons visited the Gardens in November.

BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY

DECEMBER 5th.—The following papers were read:—Mr. A. TATE, M.I.C.E.—Report of the Society's Delegate to British Association; Mr. W. H. PATTERSON, M.R.I.A.—A Notice of ancient Shell-Mounds at Rosapenna, Co. Donegal, illustrated by Finds (this paper will shortly appear in our pages); Mr. DOUGLAS LITHGOW—Gossipings about the Parish of Saul. Two ancient carved stones from the Abbey of Saul, presented to the Museum by the lecturer, were shown. Miss SUSAN RICHARDSON gave an exhibition of the latest improved phonograph, brought from U.S.A. by Mr. Alex. Richardson, Lambeg.

BELFAST NATURALISTS' FIELD CLUB.

DECEMBER 19.—Mr. W. B. YEATS gave a lecture on the subject of Irish Fairies. The Secretary read, for Miss CLARA PATTERSON, a short paper on local children's games, illustrated by photographs. Mr. W. H. PATTERSON, M.R.I.A., presented a report from the Ethnographical Committee, which showed that the Committee were only waiting for circulars and information from head-quarters before beginning systematic work in the district.

DUBLIN NATURALISTS' FIELD CLUB.

DECEMBER 12th.—The President (Dr. M'WEENEY) in the chair. Mr. J. M. BROWNE, B.A., read a paper on "The *Cicindelidæ* (Tiger Beetles) and their Distribution." The reader explained the systematic position of the family and their characteristics, and gave an account of their habits and their distribution. Mr. T. W. LYSTER, M.A., exhibited a very rare book—"Lithographia Wirceburgensis"—a strange geological hoax of the 18th century. Mr. R. LLOYD PRAEGER, M.R.I.A., exhibited a collection of Brambles, some twenty in number, made during the past season in Co. Dublin. All of these were new to the county, and most of them to district 5 of "Cybele Hibernica"; three were additions to the Irish flora. The Secretary exhibited (for Mr. J. N. HALBERT) three beetles of the genus *Rhinosimus*, of which one, *Rh. viridipennis*, appears to be new to Ireland, and another, *Rh. ruficollis*, is an addition to the Dublin list.

CORK NATURALISTS' FIELD CLUB.

NOVEMBER 29th.—The President, PROF. MARCUS M. HARTOG, M.A., D.Sc., F.L.S., gave the inaugural address of the session, entitled "The Evolution Theory." After pointing out the character of scientific theories in general, he proceeded to expound the general view of the evolution theory, and pointed out the principal arguments for and against. A short discussion followed. Mr. G. FARRINGTON, M.A., described a superficial deposit of very fine sand on a mound sloping east and west at Clay Castle,

Youghal, manifestly caused by the action of wind. He remarked that on the west side the layer was only a few inches deep, while on the east side it was three or four feet, and gave as an explanation the dryness of the east wind compared with the dampness of that of the west. A sample of the deposit which he showed contained fragments of glass, cinders, and earthenware, all much ground by contact with the sand.

ROYAL DUBLIN SOCIETY.

NOVEMBER 29th.—PROF. T. JOHNSON, D. Sc., communicated a paper on the systematic position of the *Bangiaceæ*, a group of sea-weeds well represented in Irish water. The author follows Berthold and others in considering them Florideæ, adduces several new arguments in support of the view, and discusses Schmitz's objection to the same.

ROYAL IRISH ACADEMY.

NOVEMBER 13th.—A paper was submitted by Prof. A. C. HADDON, M.A.. on "Studies of Irish Craniology. No. 2.—Inishbofin, Co. Mayo."

NOVEMBER 30th.—Dr. C. R. BROWNE read a paper on "The Ethnography of Inishbofin and Inishshark, Co. Galway."

NOTES

BOTANY.

CHARACEÆ.

Characeæ of Kildare and Queen's County.—Most of the under-mentioned plants were collected during a July day spent with Dr. Scharff, near Monasterevan, on the borders of Kildare and Queen's County; and the remainder on a day in August, spent with Prof. Sollas at Maryborough, Queen's County. The determinations have been kindly made or verified by Messrs. H. and J. Groves. *Chara fragilis*—in the Grand Canal near Monasterevan, growing in both counties; and ditch at Maryborough (form approaching *barbata*). *C. aspera*—in the canal near Monasterevan, both counties. *C. contraria*—Same stations as last, abundantly. *C. polyacantha*—in the canal in both counties, and ditch at Maryborough. *C. hispida*—bog drain near Maryborough. *C. hispida* v. *rudis*—canal in both counties. All the above appear to be additions to the flora of district 3 of "Cybele Hibernica"; and I find no previous record of *C. polyacantha* in district 5.—R. LLOYD PRAEGER.

PHANEROGAMS.

Flora of Innishowen.—During a short geological ramble round the coast of Innishowen, North Donegal, in September last, a few plants were noticed which may be worth recording. Two of these are additions to the flora of the district, as enumerated in Mr. Hart's paper in the Journal of Botany for 1883—*Anthemis nobilis*, which I found at Ballyharry east of Culdaff, and at Bree cross-roads near Malin Head; and *Cichorium intybus*, which grew in cultivated land at Greencastle. The following species appear to be rare in Innishowen, according to Mr. Hart's list, therefore additional stations may be worthy of mention:—*Fumaria pallidiflora*, Bree cross-roads on Malin Head; *Scandix pecten-veneris*, Ballyliffan; *Lamium intermedium*, Bree cross-roads and Ballyliffan; *L. amplexicaule*, Greencastle; *Polygonum Raii*, White Strand Bay; *Euphorbia portlandica*, undercliff a little north of entrance of Trawbreaga Bay; *Juniperus communis*, one large bush on a rock by the shore a mile west of Greencastle lighthouses.—R. LLOYD PRAEGER.

ZOOLOGY.

INSECTS

Coleoptera from Port Ballintrae, Co. Antrim.—The following notes on Coleoptera are the result of a month's stay at Port Ballintrae, Co. Antrim, during last August, but do not pretend to be the fruits of anything more than very intermittent collecting. As a locality, the place struck me as decidedly promising, being fairly rich in variety of wild plants, and having in Bush Bay a good range of sandhills with plenty of vegetation and a river running hard by. What struck me most, in collecting the beetles, was the extraordinary abundance of some of the species, due, no doubt, to the favourable summer—e.g., *Longitarsus jacobææ*, *Apion hæmatodes*, and *Otiorhynchus atroapterus*. The first-mentioned was nearly everywhere—their fat little yellow bodies studded the walls of the house we were staying in, lined the window-sills, and they seemed as much at home in one's bedroom as on the Ragwort which sheltered them in scores. A low stone wall in front of the house and facing the sea was, whenever the sun was on it, an excellent hunting-ground alike for this, for Apions, Coccinellas, and other more occasional visitors. On the whole, however, the number of *species* was limited and rather disappointing. Mr. Gore Cuthbert's record of *Helops pallidus* from Courtown, in the November number of the *Irish Naturalist*, has interested me, as I reckon it one of my best captures at Ballintrae. It would be interesting to know whether he got it in a similar habitat. By-the-bye, his experience as to scarcity of species seems to coincide with mine. Below are the species that seem worthy of individual record: one or two of them are probably new to the Irish list, judging from Fowler's lists of localities:—*Leistus rufescens*, only a single specimen. I have never found this a plentiful species anywhere; *Dromius nigriventris* was not rare amongst the coarse grass on the sandhills, with *D. linearis*, a very common species; *Badister bipustulatus*, only one of this turned up; *Calathus mollis* was extremely common in Bush Bay, but of *C. cisteloides* I only saw one; *Anchomenus fuliginosus* and *Amara ovata*, one specimen of each; *Amara bifrons* (*livida*), a few amongst *C. mollis*; *Bradycellus harpalinus* and *B. verbasci*, single specimens in a garden. The former is not mentioned by Fowler as Irish, but must surely have been recorded; *Cercyon littoralis*, common above high-water mark in Bush Bay; *Trechus minutus*, common; *Helophorus rugosus*, three specimens on the sandhills near the River Bush; *Olophrum piceum*, one at the Causeway in damp ground; *Bryaxis fossulata*, not uncommon under stones with the last; *Silpha atrata* v. *subrotundata*, only one specimen. I have received this variety in numbers from the shores of Strangford Lough; *Saprinus quadristriatus*, one specimen of this rare beetle on the sandhills in Bush Bay; *Brachypterus urticæ*, on nettles. Fowler says "probably in Ireland"; *Epuræa aestiva* and *Lathridius lardarius*, one specimen of each in August; *Corticaria cylindrica*, a few of this rare kind occurred with numbers of the common *C. fuscula* by shaking grass on the sandhills; *Aphodius contaminatus*, common at the Giants' Causeway; *Ægialia arenaria*, common on the sandhills; *Niptus crenatus*, one in a house at Port Ballintrae; *Ceuthorhynchus contractus* and *C. sulcicollis*, not uncommon on Cruciferæ; *C. rugulosus*, a few on Chamomile by the shore; *Apion loti* and *A. vorax*, a few examples; *A. hæmatodes*, very common on stone walls by the sea, variable in size; *Hypera polygoni*, two fine examples on the sandhills; *Otiorhynchus atroapterus*, very plentiful under low herbage close to the sea; a single specimen of *O. scabrosus* also occurred; *Chrysomela Banksii*, probably not at all uncommon, but it wants a good deal of looking for. I got it at the foot of walls, hiding in the grass; *Longitarsus jacobææ*, I have already alluded to the abundance of this insect; *L. luridus* was, of course, plentiful; *Apteropeda graminis*, a single specimen at Port Ballintrae; *Psylliodes chrysocephala* and *Ps. cuprea* were very common in a garden at Ballintrae on cabbage which had been allowed to run wild. Of the former species the var. *anglica* occurred sparingly, formerly con-

sidered a separate species, with yellow elytra and dark thorax; *Coccinella xi-punctata*, the few specimens that turned up of this beetle all belonged to a singular variety of colouring, in which the light hinder spots had run together in pairs, forming two regular black bands across the elytra, only interrupted by the suture. The type did not occur; *Coccinella obliterata*, on stone walls by the sea. They must have flown from a distance, as there is no fir about Port Ballintrae; *Helops pallidus*, this interesting species I took in some numbers by pulling up the coarse grass on the sandhills in Bush Bay and shaking it. It is variable in size, and lives at a depth of two or three inches below the surface.—BROCKTON TOMLIN, Llandaff.

A Correction.—*Pieris daplidice.*—The capture of this butterfly in our December number was erroneously given as "this month." The insect was taken in August, 1893.

BIRDS.

Female Merganser assuming Male Plumage.—On the 7th March last I received, from Co. Galway, a Merganser, *Mergus serrator*, which I at first mistook for a young male assuming adult plumage, but upon dissection I was surprised to find that it was an adult female, and from the condition of the ovary I think a very old, barren bird. Mr. H. E. Dresser, who has examined the bird, writes:—The Merganser is a very interesting specimen, and is, I should say, an old female partially assuming male plumage. It is the first one in that stage of plumage I have seen.—F. COBURN (in *Zoologist* for December).

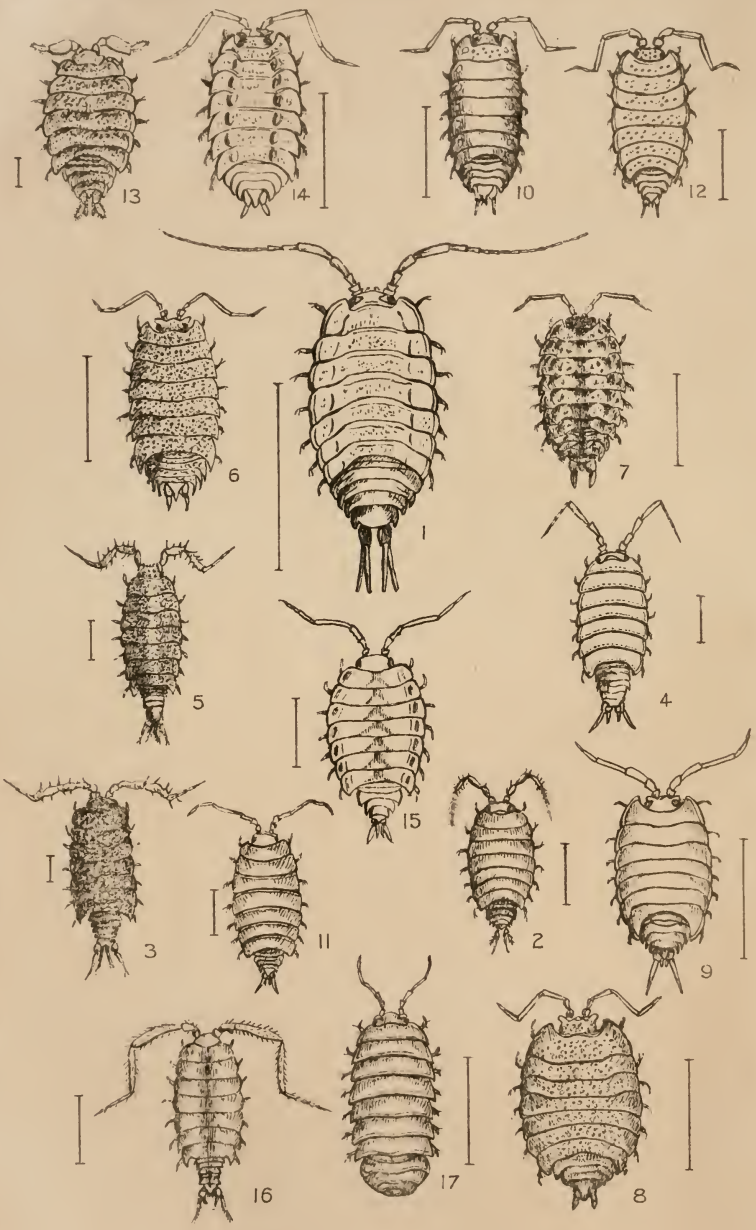
Snowy Owl in Mayo.—A very fine specimen of the Snowy Owl (*Nictea scandiaca*) was shot in the vicinity of Belmullet on the 13th December. The bird measures five feet to the extreme tip of wings, and twenty-five inches from beak to tail; weighing four pounds four ounces. The specimen has come into the possession of Mr. J. T. O'Reilly, Carne House, Belmullet, who has forwarded it to us for preservation.—WILLIAMS & SON, Dublin.

Chiffchaff in December.—I was greatly surprised on the 13th December to see a bird of this species in my garden in Rathgar, although there had been severe frost a few days previous; it evidently had little effect on this individual, as it was hopping about quite as merrily as if it were the middle of April instead of dreary December.—EDWARD WILLIAMS, Dublin.

GEOLOGY.

Irish Geology.—We learn with pleasure that Professor Cole, F.G.S., has accepted an invitation by the Belfast Naturalists' Field Club to give a course of lectures and practical work in Belfast during the coming term. It is understood that this arrangement is the outcome of the recent appointment by the Club of a committee to investigate the glacial phenomena of the Belfast district, and that the lectures and demonstrations will have special reference to local geology. We congratulate Belfast on its appreciation of the claims of geology as a branch of education, and on its good fortune in having secured such an able exponent of the science as Professor Cole.

High-level Gravels.—An able paper by Mr. T. Mellard Reade, F.G.S., in the current (December) number of *Natural Science*, deals with the origin of the well-known high-level fossiliferous gravels found on both sides of the Irish Sea. Mr. Reade has studied the beds with some care, both in Wales and Ireland, and is in favour of the "Submergence" view. He has kindly consented to contribute an article upon the subject to our pages.



THE BRITISH WOODLICE.

A S. del.

The Irish Naturalist.

Vol. III. FEBRUARY, 1894. No. 2.

THE IRISH WOOD-LICE.

(WITH DESCRIPTIONS AND FIGURES OF ALL THE BRITISH SPECIES.)

By R. F. Scharff, Ph.D., B.Sc.

[Plate 2.]

(*Concluded from page* 7.)

LIGIIDÆ.

Ligia oceanica, L. (fig. 1).

This is the largest of the Irish Wood-lice. It differs so much from all others that it is not easily mistaken. The outer antennæ are about two-thirds of the length of the entire animal, and their last joint, the flagellum, as it is called, has 11–13 articulations. In no other Irish species except the next has the flagellum more than 10. The tail or caudal appendages are long and tapering (filiform) and of about equal length. The general body-colour is of a greyish-green.

This species is common under stones between tide-marks only, never occurring inland. I have taken it along the east coast and also on the west at Glengariff and Castletown-Berehaven. Mr. Jameson obtained it at Bundoran.

General Distribution.—Common on the English (1)[1], and Scotch coast (8), and indeed along the whole west coast of Europe as far south as Gibraltar and even Malaga (2). In the Mediterranean proper it is replaced by the allied species *Ligia italica.*

[Ligidium hypnorum, Cuv.] (fig. 2).

L. Personii, Kin.

L. agile, Norman.

The figure unfortunately does not very clearly show the 10 (sometimes 13) articulations in the flagellum or last joint of the outer antennæ. As none of the species mentioned hereafter have more than seven divisions in the flagellum, this character alone suffices to distinguish *Ligidium hypnorum* from them. The size of this species and structure of the caudal appendages separate it from *Ligia oceanica.*

It has not been found in Ireland.

General Distribution.—South-east of England (11), Western Europe and Turkey (2).

[1] The numbers refer to the works enumerated on p. 7.

Trichoniscus pusillus, Brandt (fig. 3).

Philougria riparia, Kin.

This is the smallest of the Irish species, a full-grown specimen measuring only 3½ mills. in length. It is of a claret-brown colour, smooth and shining in texture, and dotted over with exceedingly minute white spots. The outer antennæ are a trifle too long and broad in my figure; three or four articulations make up the flagellum. As in the other species of the genus, the tail is very distinctly narrower than the body. The last caudal segment is deeply excavated over the insertion of the posterior appendages. *Trichoniscus pusillus* is found only in very damp places amongst moist leaves and under stones, and it runs with great agility.

It is a very common species throughout Ireland.

General Distribution.—Widely distributed in England (1), and Scotland (9), W., N., and Central Europe, Algeria and N. America (2).

Trichoniscus vividus, Koch (fig. 4).

Philougria vivida, Kin.

In colour and texture this species agrees almost precisely with the last, but it is about double the size, and the flagellum has 5–7 articulations, instead of 3–4 in the other. The outer antennæ are also devoid of the hairs or setæ by which the other two species of *Trichoniscus* are distinguished, and the last caudal segment is not excavated (emarginate).

This species has been taken under stones on the hills at Portlaw, Co. Waterford (5), the only locality in the British Islands.

General Distribution.—France (2).

Trichoniscus roseus, Koch (fig. 5).

Philougria rosea, Kin.

A beautiful light vermilion colour, with a pale yellow stripe down its back, distinguishes this species at once from all other British Wood-lice. Occasionally perfectly white specimens are found, and in spirit they all turn white.

This species has not been recorded by Kinahan. I found it plentifully in my own garden in Dublin among damp cinders in autumn; and I have, quite recently, received from Mr. R. Welch a box-full of clay from Ballyfinder, Co. Down, in the crevices of which I found an example of this very rare species.

General Distribution.—Plymouth in England (1), W. and C. Europe, Italy, Dalmatia, Algeria (2), New Zealand (10).

ONISCIDÆ.

Porcellio scaber, Latr. (fig. 6).

This and *Oniscus asellus* are the two commonest species in Ireland, and they principally do the damage to tender shoots in the greenhouse. The colour is generally of a uniform grey-slate, but numerous varieties occur, some being irregularly dotted with yellow; in others yellow becomes the prevailing colour. The strongly-marked tubercles, covering the whole of the back, are the most conspicuous feature. The flagellum, as in other species of this genus, has only two joints, and they are about equal in length in *Porcellio scaber*.

It is common everywhere in Ireland in damp as well as in moderately dry situations.

General Distribution.—Common in England (1), and Scotland (9), N. and C. Europe, N. America, Greenland and Cape of Good Hope (2).

Porcellio pictus, Brandt (fig. 7).

In size this species differs but little from the preceding one, and although it bears a certain resemblance to some of the spotted forms of *P. scaber*, the general colouring distinguishes it at once from all other species. The head is entirely black, and the black and yellow markings on the body are arranged in regular rows. It is also much less granulated than the last species.

It is one of the rarest of the Irish species, having only been found in Dublin and Belfast (5) in rather dry localities among stone rubbish.

General Distribution.—England (Kent only) (1), N., W., C. & E. Europe and N. America (2).

Porcellio dilatatus, Brandt (fig. 8).

This species is generally slightly larger and much broader than *P. scaber*, and the outer antennæ are a little shorter. The terminal caudal segment is rounded at the tip, not pointed as in *P. scaber*. The colour is grey, rather similar to that of the latter species, but it has a longitudinal series of white tubercles arranged down the middle of the back, and the surface is less strongly granulated.

It is extremely rare in Ireland, and has been found only in Dublin (5) along with *P. scaber*. It has not been recorded from England. Abroad it lives chiefly in cellars.

General Distribution.—C. and W. Europe, and Cape York, (Australia) (2).

Porcellio laevis, Latr. (fig. 9).

The very smooth and shining surface of the back distinguishes this species at once from the three preceding species of *Porcellio*. It is larger too than any of the others, and the caudal appendages are of great length. There are often two series of yellowish markings arranged longitudinally along the back, and the under side of the body and legs are yellow. The terminal segment of the tail is triangular and shorter than in the other species. The colour is greyish-purple.

Like the last, it is a rare species, having been found only in Dublin among stable-litter and at the foot of old walls (5).

General Distribution.—S.E. of England only (1), C., W., and E. Europe, Mediterranean Islands, Turkey, Turkestan, W. Indian Islands, N. and S. America, &c. (2).

Cylisticus convexus, De Geer (fig. 10).

Porcellio armadilloides, Kin.

In shape, this species reminds one strongly of *Armadillidium vulgare* (fig. 17), and like the latter, it is able to roll itself into an almost perfect ball, which quality is possessed by none of the other Irish Wood-lice to the same degree, although some of them make an attempt at rolling themselves up partially. The upper surface of the body is very convex and shining, of an iron-grey colour, with a row of ill-defined whitish spots parallel with the lateral margins. The caudal appendages are styliform, as in all other species of the genus.

Prof. Kinahan does not record this species from Ireland, and I myself only recently discovered it under stones in a disused quarry at Leixlip, County Dublin. It runs with great agility.

General Distribution.—S. E. England only (1), Scotland (9), N. C., and E. Europe, Turkey, N. America.

Metoponorthus cingendus, Kin. (fig. 11).

Porcellio cingendus, Kin.
Metoponorthus simplex, B.-L.

The narrow segments of the tail distinguish this species and the next from those of the genus *Porcellio*. In this respect they resemble the species of *Trichoniscus*, but the tail is never so long as in the latter, and the structure of the antennæ also is different. The colour of this species is rather striking, being of a steel blue with red or yellowish spots. It runs with great rapidity, and never attempts to roll itself into a ball. One of the most salient features is the transverse raised line on the anterior portion of each body-segment.

It has not been taken in England, but in the mountainous districts of Dublin, Wicklow, and Cork, and also on the coast of Kerry, and on the Aran Islands, it is common.

General Distribution.—France (2).

Metoponorthus pruinosus, Brandt (fig. 12).

Porcellio pruinosus, Kin.

The segments of the tail are rather wider than in the last species, and in this respect *M. pruinosus* approaches the Porcellios, but is still sufficiently distinguished from them. The surface of the body is more rough and granular than in the preceding one, and the general body-colour is of a uniform reddish-brown, often dotted with white spots.

I cannot agree with Prof. Kinahan that it is common in Ireland; it certainly is quite absent from the mountainous districts, and has only been taken in the neighbourhood of Dublin. It often buries itself in the ground.

General Distribution.—S. E. England only (1), Banff in Scotland (9), chiefly S. and W. Europe, but also in the East; N. and S. America, N. Africa, Sumatra and Madagascar (2.)

Platyarthrus Hoffmanseggii, Brandt (fig. 13.)

I have already mentioned the fact that this species inhabits ants' nests, and is devoid of eyes. It is perfectly white in colour. Moreover, the short flattened antennæ and the small size distinguish it at once from all other Irish Wood-lice. The body-surface is strongly granulated.

The species is new to Ireland. I discovered it first at Leixlip, County Dublin, and since then at Lismore, County Waterford, and Glengariff, County Cork.

General Distribution.—S. England (1), Banff, Scotland (9), C. and W. Europe (2).

Oniscus asellus, L. (fig. 14.)

Oniscus murarius, Cuvier.
O. fossor, Kin.

Of all the Irish Wood-lice this is by far the commonest. It was formerly used in medicine, and was supposed to cure consumption and other diseases. The general colour is of a light grey, but it varies from that to light brown and dark grey, and it is marked with patches of yellowish white, especially along the margins of the body-segments. The body-surface is glossy, and furnished with raised tubercles. The three articulations in the flagellum of the outer antennæ distinguish it at once from any of the species of *Porcellio*.

It occurs in damp as well as in dry situations, especially under bark of fallen trees and under stones everywhere. I recently submitted specimens of Prof. Kinahan's *Oniscus fossor* to Prof. Budde-Lund, who failed to recognize any specific distinction between it and this species. The young of *O. asellus* appear always to be less glossy than adults, and of a more uniformly grey colour.

General Distribution.—Throughout England and Scotland (1), almost throughout Europe, Azores, and North America (2.)

Philoscia muscorum, Scop. (fig. 15).

The species of the genus *Philoscia* have the narrow tail in common with *Trichoniscus* and *Metoponorthus*, but differ from them in the structure of the flagellum, which has three joints, whilst there are only two in *Metoponorthus*, and generally more than three in *Trichoniscus*. If there should be any doubt between *Philoscia muscorum* and *M. pruinosus* (to which it bears a certain resemblance in size and shape), the very glossy surface of the body and the dark markings along the middle of the back will distinguish the former from the more dull and uniformly coloured *M. pruinosus*. The colour of these species varies very considerably, from red to reddish-brown and black. It is extremely common, having been obtained in almost every part of Ireland, chiefly in woods under stones and leaves.

General Distribution.—S. England (1), Scotland (9), C., W. and S. Europe, and N. Africa (2.)

[Philoscia Couchii, Kin.], (fig. 16.)

Philoscia longicornis, Budde-Lund (fide Dollfus).

This species, like the last, is very smooth and shining, but it differs in being rather smaller, and in the outer antennæ being of greater length and hairy. Its colour too, which is a uniform pale grey, distinguishes the species from the preceding one.

It has not yet been found in Ireland.

General Distribution.—S. W. England (6), the shores surrounding the Mediterranean (2).

ARMADILLIDÆ.

Armadillidium vulgare, Lat. (fig. 17.)

Armadillo vulgaris, Kin.

As I have mentioned before, this is the only Irish Wood-louse in which the caudal appendages do not project posteriorly, and in virtue of their truncated shape it is able to roll itself into a perfect ball at the least alarm. It is known as the "pill millepede" along with a real millepede (*Glomeris*) which has the same faculty of rolling itself into a ball. Formerly it was in great repute for its supposed medicinal virtues, and when dried and pulverized it was spoken of very highly as a remedy for indigestion, and even weakness of sight. It is very convex and shining, and varies in colour from dark steel-grey to reddish-brown, and in the amount of its pale markings.

In Ireland it is more common in the plain than in the mountains, and it has not yet been taken on the west coast.

General Distribution.—England (1), Scotland (9), the greater part of Europe, and the adjoining portions of Asia and Africa. (Monte-Video, New York, Melbourne—introduced ?) (2).

A PLEA FOR IRISH GLACIOLOGY.

BY MISS S. M. THOMPSON.

ARE we to have another Great Ice Age? If so, when? Or are we to consider that some unexplained and catastrophic reason caused the glaciation whose traces are to be found almost everywhere over the surface of our continent? These questions are agitating the minds of geologists at present, and the diversity of answers given may be assumed to indicate the insufficiency of the evidence as yet accumulated to settle the points in question. Perhaps rarely have so many different opinions been held simultaneously by men well qualified to pronounce judgment upon any special subject, as upon the date, conditions, causes, and possible recurrence of an Ice Age; and the recent suggestion, that its date was not as remote as supposed, has added zest to investigations into ice-action and its traces. Some, who had carefully studied the subject in former years, may wish to verify their previous conclusions, and retain or modify them according to the results obtained; whilst others may be tempted by the interest of a subject so fully illustrated in every journey they take, in every new spot visited (at least in Ireland), to enrol themselves in the army of patient accurate observers, whose systematic work is needed to accumulate the mass of evidence required before any final and satisfactory theory can be formulated by the master-minds of our day.

Just a hundred years have elapsed since the strife between the Plutonists and Neptunists was raging in Edinburgh, whilst William Smith was patiently and laboriously accumulating the observations upon which stratigraphical geology was founded. Nearly half a century was to pass before the chilly suggestion of a glacial period came to clear up many vexed questions, and explain many strange deposits; and within the last few years astronomers and physicists have claimed permission to theorize upon the subject; and Dr. James Croll has given to the world the wonderful conception of regularly recurring glacial periods[1], depending upon the relative positions of our sun and earth. Who can tell what additions to our knowledge the next few years may bring, under the stimulat-

[1] J. Croll—"Climate and Time, in their Geological Relations;" London, 1875.

ing influence of the New Geology? Those who have listened to Sir Robert Ball's eloquent description of the precession of the equinoxes, and the periodic eccentricity of the earth's orbit, the "breathing in and out" of that mighty ellipse, will realize more clearly the astronomical side of the question, and more readily believe that there may have been and may be other glacial epochs. Some interesting facts in connection with this view are given by Dr. James Geikie in a recent paper on the evolution of climate[1], where he mentions that erratics have been found in Cambro-Silurian rocks as much as five feet in diameter; and he quotes Sir William Dawson's account of a large Carboniferous esker with erratics, and says that Sir Andrew Ramsay believed he discerned ice-action in the Permian breccias, and in erratics included in the Palæozoic strata of Scotland. Unfortunately, we are not likely to obtain much information about those possible early glacial periods, but surely we cannot rest content without investigating to the utmost degree everything that speaks of what we must still term *par excellence* The Great Ice Age?

Splendid work upon the glaciation of Ireland has been already done by the Rev. Maxwell Close[2], who has not only given the fruits of years of careful study on his own part, including a map showing the direction of the ice striations, but has also brought together much work done by others, especially by the officers of the Geological Survey of Ireland. Those who wish to familiarize themselves with much that has been already written upon the subject, should refer to Professor Hull's "Physical Geology and Geography of Ireland"[3], which contains a list of works on Irish geology in which papers on glacial subjects by Mr. Kinahan[4] and other writers are quoted, and which is also furnished with an interesting map showing the general direction of ice striæ in Ireland; whilst for local work, the maps and explanatory memoirs of the Geological Survey afford valuable and convenient assistance. Readers of the *Irish Naturalist* will not require to be reminded of Professor

---

[1] James Geikie—"Fragments of Earth Lore," 1893.

[2] M. H. Close—"On the General Glaciation of the Rocks near Dublin," *Jour. Roy. Geol. Soc. Ireland*, vol. i., p. 3; "On the General Glaciation of Ireland," *Ibid.*, p. 207; "The Elevated Shell-bearing Gravels near Dublin," *Ibid.*, iv., p. 36, and *Geol. Mag.*, 1874, p. 193; &c.

[3] Hull—"Physical Geology and Geography of Ireland," London, 1878.

[4] See also Mr. Kinahan's "Geology of Ireland."

Cole's "County Dublin, Past and Present," which appeared in the first five numbers of this magazine[1], and contains an interesting discussion on glacial phenomena; and in last month's issue we have enjoyed some very recent information from Professor Sollas, referring to glacial investigations which he is at present engaged upon, in conjunction with Mr. R. Lloyd Praeger, Hon. Sec. of the Dublin Naturalists' Field Club.

Last summer, a communication from Mr. Percy F. Kendall, F.G.S., Secretary to the Erratic Blocks Committee of the British Association, was received by the Belfast Naturalists' Field Club, urging them to commence systematic investigations into the glaciation of the north-east of Ireland, especially with regard to erratics and other stones included in the drift. In response to Mr. Kendall's request, a sub-committee "to investigate the glacial phenomena of the district" was appointed in August last, and work was immediately commenced. Glacial inquiry is, however, not a new departure in the Club, as in its Report for 1879–80, a paper by Mr. Joseph Wright, F.G.S., upon the Post-tertiary Foraminifera of the north-east of Ireland contains a table showing their distribution in the boulder clay of that district, and in the gravels at Balscadden Bay, Ballybrack, and Ballyedmonduff, in the vicinity of Dublin. The same Report also contains a paper by Mr. S. A. Stewart, F.B.S.E., giving a list of the Mollusca of the north-eastern boulder clay, and the Report for 1892–93 gives a list of both Mollusca and Foraminifera collected during a recent investigation of the Ballyrudder gravels near Glenarm. But the inquiries now initiated deal more particularly with the stones included in glacial deposits, and the measurement and recording of the larger erratic boulders. Mr. Kendall tells me that in the twenty-two years of the Erratic Blocks Committee's existence no report has been received from Ireland! Surely we may hope that Mr. Kendall's reproach may be wiped away during the coming year, and that Irish geologists will undertake a united, systematic, and prolonged attack upon the icy problems that lie awaiting the investigator and observer.

In a pamphlet written by Professor Sollas with reference to the visit of the Geologists' Association to Dublin in July last[2],

[1] *Irish Nat.* 1892.

[2] W. J. Sollas—"The Geology of Dublin and its neighbourhood," *Proc. Geol. Ass.*, 1893.

he mentions that he is studying the stones found in glacial deposits, in conjunction with Mr. Pomeroy of Trinity College, Dublin, and he has since commenced the other glacial inquiries already referred to. There are other scientific societies and clubs in Ireland, as well as many isolated observers, no doubt able and willing to help the movement, and as the work would be more valuable and more easily correlated with the glaciology of other countries if carried out on a somewhat uniform method, it may be worth while to draw attention to the little handbook published by the Glacialists' Association[1], giving an outline of the work suggested, which can easily be modified to suit local requirements.

In Belfast we have commenced to form a type collection of stones from our glacial deposits, carefully labelling each specimen with the locality where it was found, and intend ultimately to appeal to experts in petrology to assign to unknown foreign rocks their parent locality. The height above sea-level of each deposit is also being recorded, and general features of the surrounding landscape. In addition to this, we are tabulating the percentages of different rocks occurring in each bed, taking 100 stones at random, large and small, and noting the number of each rock found; this is yielding interesting results. Photographs and sketches of the sections examined are obtained if possible. A bag of the matrix, be it clay, sand, or gravel, is also brought away for chemical and mechanical analysis, and also for the very important and necessary search for minute organic remains, which has yielded in the north such marked and striking evidence of the marine character of the glacial deposits as to make the belief in a submergence almost if not quite universal among local geologists. The value of this biological evidence cannot be too strongly insisted upon, as not only dealing with the supposed submergence, but also as affecting the question of milder interglacial periods. In the paper previously referred to, Mr. Stewart writes that—"the "so-called interglacial gravels seem to be only local deposits "of one continuous period, during which arctic or semi-arctic "conditions prevailed over this country without any interval "of relaxation"; and that "the sands and gravels at Bally-

[1] Hints for the Guidance of Observers of Glacial Geology, by Percy F. Kendall, F.G.S. To be obtained from the Assistant Secretary, 19, Seaton Buildings, Water-street, Liverpool. Price One Shilling.

"rudder, which Professor Hull regards as interglacial, yield "abundant specimens of a fauna as arctic in character as any "portion of the boulder clay." It is interesting also to find that such a fragile shell as *Leda pygmæa* is frequently found in the boulder clay in a perfect state, with valves united, and that in spite of the great number of shell fragments, perfect specimens are frequently found under such conditions as preclude the idea of transportation or re-deposition.

The search for "foreign" rocks in the deposits is in itself of surpassing interest, and the glacial geologist spends many delightful hours in this exciting pursuit. We are watching keenly for Scottish fragments, especially for the unique Ailsa Craig eurite, which has been found at Greenore and Killiney by Professor Cole, and at Greystones by Professor Sollas. It is, however, possible that as the coalescence of British and Scandinavian ice in the North Sea allowed Scandinavian erratics to be found in Yorkshire and southwards, but not, as yet, in Scotland, so the supposed meeting of Scotch and Irish ice-sheets in the Irish Sea may have shunted the Scottish stream south-eastwards, so that fragments from Ailsa may not have reached our district—a suggestion which their presence in the Moel Tryfaen deposits seems to favour; it is one of the problems of modern glacial geology to account satisfactorily for the transport of these fragments from their parent rock to their Welsh resting-place, fully a thousand feet higher.

Remembering that where we now find the greatest rainfall, the glacial period was also most severe, we see in Ireland an admirable field for inquiry, and in the *Irish Naturalist* a valuable medium for recording and publishing the results obtained. Nor can we doubt that from lack of such a publication in former times facts remained unrecorded, and important observations were lost to science (we must earnestly hope not irretrievably), that may now be given to its readers. Many unpublished glacial observations must exist that were made incidentally by members of the Geological Survey, as well as by individual geologists, perhaps working at other questions, which we may surely hope to see gradually collected in these pages, so that our Irish magazine may be the means of contributing to the scientific world valuable information, and casting new light upon the, as yet, unsolved problems of Glacial Geology.

NOTES ON THE FLORA OF THE NORTH-EAST OF IRELAND.

BY SAMUEL A. STEWART, F.B.S.EDIN.

By the preparation and publication of the "Flora of the North-east of Ireland,"[1] in 1888, our knowledge of the native vegetation of the three north-eastern counties of Ireland was summarised to that date. That Flora, while focussing the hitherto scattered researches of our local botanists, also served another and a valuable purpose. It has had the effect of stimulating the zeal of the younger naturalists. It has shown them wherein our knowledge of plant-distribution in the district was defective, and has led them, more or less, to systematize their work so as to remedy these defects, and to strive to fill up the remaining gaps.

As will be seen from the appended catalogue of species, the results have been a most gratifying enlargement of our local lists, and, in addition, we get a nearer approach to the truth as respects the local distribution of our plants. The untiring researches of Mr. R. Lloyd Praeger have been rewarded by most valuable discoveries. Mrs. Leebody, of Londonderry, has added considerably to our knowledge of the plant-life of her county—notably in the case of *Spiranthes Romanzoviana*, the finding of which in Derry followed so quickly on Mr. Praeger's record of its occurrence in Armagh.

The list which follows contains all the known additions to the north-eastern Flora (except Musci and Hepaticæ) since the publication of the work before-mentioned, and it also embodies additional localities for many of the rarer species, thus giving a truer idea of their distribution. A selection had to be made of the more important plants, but it is hoped that ere long a full and complete supplement to Stewart and Corry's Flora may appear. In anticipation of this, and in order to make it as complete as possible, local botanists should exert themselves to their utmost, and prove that in this delightful department of scientific work they will not be one whit behind the foremost districts in the empire.

---

[1] "A Flora of the North-east of Ireland, including the Phanerogamia, the Cryptogamia Vascularia, and the Muscineæ." By Samuel A. Stewart, F.B.S.E., and T. H. Corry, M.A., F.L.S., &c., 1888.

It will be observed that many of the records here collected have already appeared in various publications. The principal increase to the County Down flora is due to the exhaustive paper on the Mourne Mountain flora by Stewart and Praeger, in the Proceedings of the Royal Irish Academy[1]. A number of notes from the Proceedings of the Belfast Naturalists' Field Club have been availed of; and the pages of the *Irish Naturalist* and of the *Journal of Botany* also contribute valuable information.

To the various naturalists whose names appear as contributors in the succeeding pages I am deeply indebted. It is due to their kind co-operation that this paper, condensed as it is, has assumed such goodly proportions.

The contractions used for authorities are—S. and P.—Stewart and Praeger, *op. cit.*; R. Ll. P.—R. Lloyd Praeger; S. A. S.—Samuel A. Stewart.

LIST OF RECORDS.

Ranunculus circinatus, Sibth.—In the Lagan Canal, Co. Down, close to its junction with Lough Neagh, R. Ll. P., 1892. Mr. Praeger reports it as abundant in the lough further to the west, at Derryadd Bay, Co. Armagh. This is a valuable and unexpected addition to the flora of the north-east. The plant does not seem to have been previously found north of the Liffey.

Papaver hybridum, Linn.—One plant on roadside near Killough, Co. Down, R. Ll. P., 1892.

Barbarea præcox, R. Brown—Fields at Struell Wells, near Downpatrick, R. Ll. P., 1891. This plant has been met with previously in the south of Ireland as an alien introduced. Not hitherto found in the north.

Cardamine amara, Linn.—Abundant on Co. Down side of the Lagan at Glenmore, near Lisburn, J. H. Davies.

Sinapis alba, Linn.—Abundant in many fields at Killowen, Co. Down, S. and P. Killough, Co. Down, R. Ll. P., 1892.

Draba incana, Linn.—Refound on Magilligan sandhills by Mrs. Leebody, in 1890, but small and scarce.

Lepidium campestre, Linn.—Sparingly in gravelly fields at Killowen, south of Rostrevor, S. and P. The only certainly ascertained locality for this plant in Co. Down.

Raphanus maritimus, Smith—Mr. J. H. Davies finds (1893) a second Co. Down station for this plant on the coast at Ballywalter. It is plentiful from Killough to St. John's Point, S. A. S., 1893.

Drosera intermedia, Hayne—Peaty marsh at Colligan Bridge on the Kilkeel River, also in another marsh to the southwest, and in boggy spots by the river near the base of Slieve Bingian, S. and P.

---

[1] "Report on the Botany of the Mourne Mountains, Co. Down"; *Proc. Roy. Irish Acad.*, 3rd Series, vol. ii., No. 2, 1892.

Elatine hydropiper, Linn.—In Loughbrickland, Co. Down, Rev. H. W. Lett, 1886, and subsequently. A new locality, and the only one in Ireland where this plant has been found recently. Mr. Praeger, when examining the duplicate specimens in the immense herbarium of Dr. J. Boswell Syme, now in the possession of Mr. F. J. Hanbury, F.L.S., London, found a number of sheets of Irish specimens of this plant. They are labelled, "Lagan Canal near high-tide water-mark, County Antrim, coll. August, 1847, and comm. by Dr. Mateer." This is, no doubt, the station "near Belfast, Dr. Mateer," published in *Flora of Ulster*, but which was discredited by the compilers of *Flora N. E. Ireland*, as vague and unreliable. Mr. Lett's new station, and Mr. Praeger's discovery are most welcome contributions to our knowledge of the local history of this very rare plant. There can be no doubt that it is now extinct in its Belfast station.

Sagina ciliata, Fries.—Very sparingly on sandhills at Newcastle, Co. Down, S. and P. An addition to the flora of the county.

Spergularia rubra (Linn.), Persoon—Abundant on the damp margin of Lough Islandreavy, Co. Down, S. and P., 1890. Very rare in district 12, and not known elsewhere in the county.

Lavatera arborea, Linn.—Summit of an isolated sea-stack on the shore of Rathlin Island, R. Ll. P., 1892. No doubt native here.

Hypericum quadrangulum, Linn. var. **maculatum** Bab.—Lane at Marino station, Holywood, R. Ll. P., 1892. New to the Co. Down flora.

Hypericum elodes, Huds.—Peaty marsh near Colligan Bridge, and several other places in Mourne Mountains, S. and P. Ballyarnott race-course, Co. Derry, Mrs. Leebody, 1891.

Geranium perenne, Huds.—Roadside near Whitewell quarries, W. D. Donnan, 1890. A new county record.

Erodium moschatum, L'Herit.—Annalong, Co. Down, H. C. Hart, *Proc. R.I.A.*, 1884, and subsequently, S. and P. Waste ground near Killough, R. Hanna, 1893.

Rhamnus frangula, Linn.—Re-discovered (a good number of bushes) in Shane's Castle woods by Prof. R. O. Cunningham, 1890.

[*Ononis spinosa*, Linn., has not been re-found in Co. Down, and was, no doubt, a casual.]

Trifolium hybridum, Linn.—Frequent in sandy, cultivated fields, and waste ground, and though without claim as a native, is thoroughly established as a colonist.

Prunus cerasus, Linn.—Near Annalong, Crossgar, Downpatrick, and Crawfordsburn, Co. Down, also Cushendall and Ballycastle in Co. Antrim, and Draperstown in Derry, R. Ll. P., but not considered a native.

Poterium sanguisorba, Linn.—Plentiful in a meadow at Glenmore, near Lisburn, J. H. Davies, 1891. This is a limestone species, not known elsewhere in the north-east, and a doubt has been expressed as to whether the plant is a native here.

Sanguisorba officinalis, Linn.—Abundant and luxuriant on railway bank near Donaghadee, J. H. Davies, June, 1893. Interesting as confirming former records, and widening the Co. Down locality of this plant, so rare in Ireland.

Potentilla tormentilla var. **procumbens,** Sibth.—On the area in front of the Belfast Museum, S. A. S. Kilbroney and Newcastle, S. and P. Marino, Co. Down, R. Ll. P.

Agrimonia odorata, Mill.—Roadside at Steamboat-quay, Downpatrick, R. Ll. P. 1889.

Rubus ammobius, Focke—In very small quantity by the lake-margin in Castlewellan demesne, Co. Down, S. and P., 1890. Not yet found elsewhere in Ireland. It is one of the rarest British brambles.

R. nitidus, W. and N. var. **hamulosus.**—Margin of Altnadua Lake, Co. Down, S. and P.

R. rhamnifolius, W. and N.—Magilligan, Co. Derry (J. Ball, F.R.S.) Focke, *Jour. Bot.*, June, 1891. New to Co. Derry.

R. umbrosus, Muell.—Whitewater and Donard Lodge, Co. Down, S. and P.

R. nemoralis, Muell. var. **pulcherrimus,** Neum.--Lisdalgan near Saintfield, Co. Down, Rev. C. H. Waddell, 1893.

R. pyramidalis, Kalt.—Tollymore Park, Donard Lodge, and plentiful in Moygannon Glen, S. and P.

R. macrophyllus, Weihe, var. **glabratus,** Bab.—Thickets by the Ghann River, Co. Down, S. and P.

R. Drejeri, G. Jensen—Common about Saintfield, Co. Down, Rev. C. H. Waddell, 1893.

R. Koehleri, W. and N. var. **pallidus,** Bab.—Saintfield, Co. Down, Rev. C. H. Waddell.

R. chamœmorus, Linn.—After repeated unsuccessful searches by several botanists, this plant has been refound in Ireland. Messrs. Hart and Barrington were so fortunate as to meet with it in 1892, on the Sperrin Mountains in Tyrone and Derry, thus verifying the old record of Admiral Jones. They report it as stunted in size, barren, and in very small quantity; *vide Jour. Bot.*, 1892, p. 279.

Rosa involuta, Smith—This and its var. *Sabini*, Woods, occur by mountain roads near Hilltown, Co. Down, S. and P. Not known elsewhere in the county.

[*R. micrantha*, Smith, was recorded in "Flora N.E. Ireland" as occurring in Co. Antrim. This record was based on two imperfect specimens, considered by good authority as referable to that species. Last season, Rev. S. A. Brenan conducted Dr. Shoolbred to the original bush, and Dr. Shoolbred reports it to be *R. rubiginosa.* This reference has been confirmed by Rev. W. Moyle Rogers, and consequently *R. micrantha* must be deleted from our lists.]

Epilobium angustifolium, Linn.—Cliffs of Eagle Mountain, and south of Blue Lake, Mourne Mountains, S. and P. Not found as a native elsewhere in the County of Down.

Sium erectum, Huds.—Mr. Praeger finds this plant of frequent occurrence in the district around Downpatrick.

Ligusticum scoticum, Linn.—Rocky shore at Bushfoot, Co. Antrim, R. Ll. P., 1888.

Myriophyllum spicatum, Linn.—Western shores of Lough Beg, Co. Derry, R. Ll. P., 1893. An addition to the Derry lists.

Galiummollugo, Linn.--Lawn at Rowallen, Saintfield, Co. Down, D. Redmond, 1893. Eglinton, Co. Derry, Mrs. Leebody, 1892. Not previously met with in Derry.

Valerianella dentata, Willd.—Cultivated fields about Killowen, Lisnacree, and Newcastle, S. and P. Killyleagh and Killinchy, Co. Down, R. Ll. P., 1890.

(TO BE CONTINUED.)

A NEW IRISH EARTHWORM.

BY REV. HILDERIC FRIEND, F L.S

I HAD almost come to the conclusion that the list of British terrestrial Annelids must be closed. For years past I have examined specimens by the thousand from every part of the country, and it is now many months since I have seen anything new. I had tried in vain to secure collections from the Highlands of Scotland and the western coast of Ireland, where new material was most likely to be found. At last, however, a well-tried collector and devoted naturalist, Dr. Trumbull, to whom we already owe one or two similar discoveries, has visited the west of Ireland and entered upon a successful campaign. His first consignment of specimens, which reached me about the middle of November, contained, in addition to eight representative species, one which is new to Britain, and has hitherto been recorded for only one other locality. Three years ago Prof. Michaelsen published in one of the Hamburg journals an account of a new species of earthworm found at Valencia in Spain. I believe it has not been heard of since, till unearthed at Clonmore, Co. Clare, Ireland. It seems desirable, therefore, that I should give a diagnosis of the worm, especially as I am able to enlarge, as well as endorse, the account already supplied.

Let us therefore take Prof. Michaelsen's account of the worm from Valencia (*Allolobophora Georgii*), and compare our Irish specimens therewith. I give a popular translation of the scientific diagnosis, that those who are not experts may be able to follow the account. My translation is based on the description of the species supplied by Dr. Rosa in his recent and invaluable revision of the Earthworms.[1] The original memoir of Michaelsen is not at present in my possession.

"The worm is 24 to 29 millimetres in length and 2½ in diameter. It contains from 105 to 110 segments, and the form is somewhat trapezoid. The colour of the living animal has not been recorded, but the bristles are in pairs, of which the individuals are close together. The lip, which is small, has a large backward process or tenon, which cuts about a third of the first segment or peristomium. The girdle covers seven, sometimes eight, segments, extending from the 28th or 29th to the 35th. The tubercles on the girdle occupy segments 31 and 33, and are much enlarged transversely. The male aperture on the 15th segment is on a swelling, and the first dorsal pore is between segments four and five.

[1] "Revisione dei Lumbricidi," Torino, 1893.

Examined internally, the sperm-sacs in segments 10 and 11 open into the space between 9/10 and 10/11, in the direction of the fourth or dorsal setæ. In this respect it agrees with another species (*A. turgida*), with which also it corresponds in other respects."

I am bound to confess that many investigators would regard these two worms as simply varieties or sub-species, but this is no sufficient reason for ignoring their differences, even if they are slight; for, as Wallace has pointed out, it is by the study of minute variations such as these, which the older systematists disregarded, that we may hope to obtain light on the evolution of species. The specimens which I have received from Co. Clare correspond exactly with the description already given, but I am able to add a few details to the same, especially in regard to colour. I have examined a dozen living specimens, and may now submit the result.

Allolobophora Georgii, Mich.—Length from 1½ to 2 inches, breadth one-eighth to one-sixth. There are upwards of 100 segments, twenty-eight of which usually precede the girdle, while seventy or more follow it. The girdle covers seven or eight segments, is closely fused on the back, but distinct on the under side, so that the rings can be easily counted. The tubercles on the girdle are in pairs, on segments 31 and 33. In colour the worm is darker than is usually the case with its nearest ally, *A. caliginosa (turgida)*, and resembles some of the varieties of the Green Worm *(A. chlorotica)*. Head ruddy brown, with a lighter patch where the sexual organs are situated, viz., between segments 9–12, and a dirty brown behind. The girdle is lighter than the rest of the body, and shews a tendency to a blue-grey. The colours are all indefinite, obscure, and difficult to define. It is evident that the worm would be specially adapted to poor soil. I have been able to detect the presence of those peculiar bodies known as spermatophores on more than one specimen, on segments 28–29 or 29–30. The similarity between this worm and its two nearest allies will be seen if the numerical formula representing the girdle and tubercle-segments of each are set forth. The numerator represents the segments occupied by the tubercles or papillæ *(tubercula pubertatis)*, and the denominator the girdle-segments. The numbers in brackets shew the overlapping of the girdle where it is not constant.

A. turgida.	*A. Georgii.*	*A. chlorotica.*
31 : 33	31 : 33	31 : 33 : 35
(27) 28 – 34 (35)	(28) 29 – 35	(28) 29 – 37

There are now four earthworms known to occur in Ireland, which have not been found anywhere in Great Britain. Two of these (*Lumbricus papillosus*, Friend, and *Allurus macrurus*, Friend) are unknown at present outside the Emerald Isle. The other two (*Allolobophora hibernica*, Friend, and *A. Georgii*, Mich.) occur in Italy or Spain, though the intermediate countries, England and France, know them not. It is too early yet, however, to speculate on the bearing of this fact upon the

interesting subject of island faunas and floras. I trust that the discovery of Dr. Trumbull will result in other collectors from the west and south consigning to me series for examination.[1]

PROCEEDINGS OF IRISH SOCIETIES.

Royal Zoological Society.

The Gardens have recently acquired a Jaguar, a Hairy Tapir, a Golden Agouti, three Tree Ducks, two Curassows, four Crested Quail, and two Black Parrots, by purchase.

2,583 persons visited the Gardens in December.

Dublin Microscopical Club.

November 16th.—The Club met at Mr. G. H. Carpenter's, who showed the stridulating organ of a red ant (*Myrmica ruginodis*). This organ, which has been recently described by Dr. D. Sharp (*Trans. Ent. Soc.*, 1893) consists of a number of very minute transverse striations upon the constricted collar of the third abdominal segment. The hinder edge of the second segment is produced downwards into a sharp ridge which, by scraping across the striations, produces a note of very high pitch.

Dr. R. F. Scharff showed a woodlouse, *Trichoniscus roseus*, new to the Irish Fauna. This woodlouse is distinguished from other members of the genus principally by its brilliant colour, which is of a light vermilion with a yellow stripe down the back. A more detailed description of this species and its affinities is published in this number of the *Irish Naturalist*. It had previously been known only from Plymouth, where it was found in Prof. Spence Bate's cellar; the present record is therefore not only the first for Ireland, but also the second for the British Isles. It was discovered among damp cinders in a garden in Leeson Park, Dublin, and the identification has been confirmed by Prof. Budde-Lund of Copenhagen.

Mr. Greenwood Pim exhibited specimens of *Puccinia coronata*, Corda, sent him by Prof. Johnson from several localities in Dublin and Meath, where this season it seems to have been a great nuisance. It is peculiar in having short blunt appendages on the top of the spore, which are found in no other British *Puccinia*. It is the first record in this Dublin district, but Mr. Lett finds it in the North.

Mr. F. W. Moore showed the conidial stage of *Xylaria rhopaloides*, sections of which had been exhibited at a previous meeting, the reproductive stage not being then available.

Prof. T. Johnson exhibited a preparation of *Bonnemaisonia asparagoides* C. Ag., showing carpospores germinating *in situ*. The specimen was found drifted on the shore at Sutton on the north side of Dublin Bay and was of interest because the appearance of the carpospores in some of the cystocarps suggested zonate tetrasporangia; *B. asparagoides*, though growing round the whole British coast, being one of the few Florideæ in which tetraspores are not known.

[1] Such packages, preferably tin boxes lightly packed with soft clean moss to keep the worms healthy and fresh, should be sent to 7, Fern Bank, Cockermouth, Cumberland, labelled Natural History Specimens only.

Mr. M'Ardle exhibited specimens of a liverwort, *Frullania germana*, Tayl. which is often passed over for the commoner *F. tamarisci*, Mich., leaves of which he also exhibited to show the characteristic line of cells, the contents of which are peculiar; this peculiarity does not occur in the leaves of *F. germana*, and forms one of the marks of distinction between the two plants. It is also a more beautiful object than *F. tamarisci*, larger and with greater lustre, and the bracts of the perianth are entire. The auricles are larger and more highly coloured, oblong ovate in shape, ventricose. Mr. M'Ardle also exhibited dried specimens of both plants mounted on card-board, which he collected last October on Slieve Glah, Co. Cavan, which is a new locality for the plant.

Prof. A. C. Haddon showed the two kinds of budding in the polyzoon *Flustra*; the one by means of which the colony is maintained, the other peripheral, causing the growth of the colony. In the former the parent organism decays and forms a "brown body" which is digested by the daughter bud.

Dr. R. H. Creighton of Ballyshannon sent for exhibition micro-photographs of Phyllopod crustaceans obtained in the north-west of Ireland.

Belfast Natural History and Philosophical Society.

January 2nd.—The President (Prof. FitzGerald, M.I.C.E.) in the chair. Mr. Conway Scott, C.E., delivered a lecture on National Health. An animated discussion ensued, in which the following took part:—Dr. Whitaker, Prof. Redfern, Dr. MacCormac, Messrs. Cowan, C.E., Robert Gray, Seaton F. Milligan, M.R.I.A., J. H. Greenhill, John Horner, J.P., William Armstrong, and Henry M'Loughlin.

Belfast Naturalists' Field Club.

December 20th.—The President (Mr. Wm. Swanston, F.G.S.), gave a short opening address, his subject being "The Study of Geology, and the advantages to be derived therefrom." Mr. Wm. Gray, M.R.I.A., gave a lecture entitled "What is a Stone? Being a Demonstration of North of Ireland Rocks."

Dublin Naturalists' Field Club.

January 9th.—Annual Meeting. The President (Dr. M'Weeney) in the chair. The Secretary (Mr. J. M. Browne, B.A.), read the annual report, which was passed, as was also the statement of accounts, which was submitted by the Treasurer (Prof. Johnson, D.Sc.) Both showed the Club to be in a flourishing and sound condition. The election of office-bearers was then taken up. Mr. G. H. Carpenter, B.Sc., was elected President, *vice* Dr. M'Weeney, retired. Prof. G. A. J. Cole was elected Vice-President, *vice* Dr. Scharff, and Mr. R. Lloyd Praeger Hon. Sec., *vice* Mr. J. M. Browne. Mrs. J. T. Tatlow, and Mr. N. Colgan were elected to fill vacancies on the Committee. The new Vice-President, Prof. Cole, having taken the chair amid applause, a hearty vote of thanks was passed to the outgoing officers for their constant devotion to the Club during their term of office. On the motion of Dr. M'Weeney, a sum of £5 was voted to the editors of the *Irish Naturalist*, to help towards defraying the expenses of the Journal during the present year. Prof. Johnson, D.Sc., announced his willingness to give a course of lectures and demonstrations on botany for the benefit of the members of the Club. Several members spoke in grateful terms of the generosity of Prof. Johnson's proposal, and the Secretary was instructed to issue a circular, in conjunction with Prof. Johnson, acquainting members with the proposal.

NOTES.

BOTANY.

PHANEROGAMS.

Artemisia Stelleriana in Co. Dublin.—In the *Journal of Botany* for January, Mr. N. Colgan records the finding of this handsome plant on the North Bull by Mr. C. B. Moffat. The plant grows in scattered patches among the sandhills, and appears quite naturalized. It is a native of Kamtschatka.

Fall of Leaf of the Holly.—It is worth noting as an effect of last year's unusually long summer, that all the Hollies that I have observed or heard of in this part of Co. Down and the adjoining districts of Co. Armagh, let fall their old leaves of 1892 growth at the end of November and beginning of December, 1893. April is the month when this evergreen in ordinary seasons performs this change of leaf, so that what I have just noticed has taken place nearly five months before the regular time of the fall of the leaf of this shrub.—H. W. LETT, Loughbrickland.

County Dublin Flora.—On looking over the "Notes on the Dublin Flora" which appeared in last month's issue of this Journal, it occurred to me that some readers might be in danger of so misconstruing certain passages in the paper as to carry away an impression that I was averse to receiving aid from other botanists in the work of preparing a county Flora. To prevent any such misrepresentation, which, I am sure, my friend, the writer of the recent notes, is quite as anxious to guard against as I am myself, I take this opportunity of once more expressing my desire to receive any information likely to throw light either on the history or on the actual state of the Co. Dublin flora. Before the close of last year I had received assurances of aid from almost every botanist who has paid special attention to the Co. Dublin. These willing helpers are, I know, content to await full acknowledgement, at the proper time and in the proper place, for the assistance they have already given me, and will, I am confident, continue to give me. For them, such a notice as this is superfluous. There are others, however, and perhaps, not a few, who while they have made no special study of the Dublin flora, may, nevertheless, have made some casual observations of interest; and it is to ensure the collection of such occasional memoranda that I have requested the editors to grant me space for these few words.—NATHANIEL COLGAN, Dublin.

ZOOLOGY.

ROTIFERS.

Melicerta ringens.—In one of my aquariums I have at present an immense generation of *Melicerta ringens* of all stages of growth, from the young ones busy laying the foundation-stones of their tubes, to very full-grown tubes of unusual length. The thing, however, which I wish to note is that sometimes one tube is seated upon another in almost every variety of order from clusters of two up to clusters of *seven*. I have never seen anything like this before in the case of *Melicerta ringens*. They seem to be breeding very rapidly, for on a plant of *Ranunculus aquatilis*, which in a beautiful arborescent growth fills the aquarium, they are abundant. I think this clustered condition of the tubes arises from the fact that there are no quick-moving creatures in the aquarium, such as water-boatmen or water-beetles, to *make a stir in the water*, and the eggs being extended in this motionless pool are not floated away to a new site, but get attached to the side of the parent tube and proceed to build there; and so we find them as I have described. To see *Melicerta ringens* at work, building and dining at the same time, is always an interesting sight; but

to see a cluster of them so engaged is a spectacle of beauty indeed. I observe that this beautiful rotifer much prefers building on such narrow leaves as the under-water foliage of *Ranunculus aquatilis* to building on broader ones, such as the *Potamogetons* or even the *Anacharis*. I shall be very pleased if any brother naturalist desires to see this case that he should call at 25, Rugby-road, Belfast. I think it probable that any one might have this rotifer in this condition by having a good seed of them in a quiet aquarium where only the *Planorbis* and *Limnæa* or such slow-moving creatures are kept, and the water allowed to be very motionless.

JOHN ANDREW, Belfast.

INSECTS.

Lepidoptera in the Belfast District in 1893.—The season of 1893 in this district, as in most others, has been fairly productive in lepidoptera, although, in consequence of the abnormal heat, many species emerged much before their usual time, and had disappeared completely when they were looked for in their usual localities. Of the butterflies, *Vanessa atalanta* and *V. urticæ* have been unusually abundant, and second broods of both species were seen; of *Argynnis paphia*, a few specimens were seen in Donard demesne near Newcastle, Co. Down, on June 18th, a very early date for the species; *Lycæna minima* was out already on May 30th on the cliffs of Island Magee, and a few were seen on Knockagh, near Carrickfergus; one specimen of a second brood of *Cœnonympha pamphilus* was taken on the Belfast Hills on September 3rd; the species is regularly double-brooded in England, but usually single-brooded in Ireland. Among Sphinges, *Macroglossa stellatarum* was hovering about a white-washed wall on the shore at Newcastle on July 16th, and *M. bombyliformis* was abundant at flowers of *Pedicularis* on the Belfast Hills as early as May 7th. Of the Bombyces, *Nemeophila plantaginis* was abundant on the slopes of Island Magee, June 4th; *Hepialus velleda* was very common everywhere this year, flying in crowds over Bracken on the hills and over beds of Nettles on the lowlands; larvæ of *Bombyx quercus* v. *callunæ* were found full-fed at Black Head, June 23rd, and larvæ of *Dicranura vinula*, *Saturnia pavonia*, and *Pygæra pigra* (or *curtula*) on dwarf sallow bushes in the valley above Bloody Bridge, Mourne Mountains. Of Noctuæ, *Bryophila perla* occurred on walls at Newcastle, all the specimens being typical; pale form of *Acronycta rumicis* comes commonly to sugar in the woods at Newcastle; of *Hydræcia nictitans*, the specimens occurring in this district, both in the marshes about Belfast and on the sand-hills at Newcastle, belong to the form which has been distinguished as a probably distinct species (*H. lucens*). I have not taken typical *nictitans* in this district, but have a specimen from Wicklow; *Apamea ophiogramma*, one specimen in Belfast marshes; *A. leucostigma* is common in the same locality, the type and var. *fibrosa* being equally common. *Miana literosa*, a few in the same places as the last species; it was very abundant at Howth in July; *Celæna Haworthii* was common on the hills at the end of August; *Stilbia anomala*, one specimen in the Mournes; *Agrotis vestigialis* was abundant on the sand-hills near Dundrum, Co. Down, nearly all being of the pale typical form, but a few grey suffused specimens occurred; *A. cursoria* was scarce in the same place; *A. tritici* very abundant, mostly of the reddish-brown form common on the Irish coast sand-hills, but a few grey and pale red specimens were picked out of the hundreds that covered the flower heads of *Senecio jacobæa* on the sand-hills; *A. præcox* was common in the same place, and a few *A. lucernea* also occurred; *Tæniocampa opima* was taken at sallow bloom in April, together with commoner species of the genus; *Xanthia fulvago*, at Belfast in August; *Cirrhædia xerampelina*, two specimens on the trunk of an Ash in Castlewellan Park, August 14th; *Dianthæcia nana*, commonly at flowers of *Lychnis flos-cuculi* in Colin Glen; *Hadena adusta* at rest on heather on the Belfast hills in May; *H. contigua*: a re-

markable specimen was taken in the Mourne Mountains in July; it was just out of the pupa, and all the dark parts of the fore-wings were suffused with deep rose-pink, while the pale portions were a semi-metallic green; these colours faded gradually, and disappeared completely in about two months. Of Geometræ, *Ellopia prosapiaria* was common in Donard demesne in June; *Nyssia zonaria*, very abundant on April 3rd at Ballycastle; one female was seen on the 1st; I failed to find the species either at Whitepark Bay or at Portrush. *Boarmia repandata* v. *conversaria*, a specimen of this fine banded variety was seen, and missed, in Donard demesne on June 18th; *Gnophos obscurata*, the specimens from Newcastle are very dark; it occurs both on the sand-hills and on the hill-sides; *Eupithecia indigata* occurred at Belfast and *E. constrictata* at Island Magee; *Melanippe tristata* was swarming about *Galium* on Knockagh on June 7th; *Phibalapteryx lapidata*—of this scarce species I took five specimens on the side of Divis Mountain on September 3rd; the males were much worn, but the females nearly fresh from the pupa; *P. vittata* was as common as usual in the marshes near Belfast, where its food-plant, *Galium palustre*, is abundant.—CHARLES W. WATTS, Belfast.

Lepidoptera at Strabane.—The Scarlet Admiral (*Vanessa atalanta*) was this season in great numbers all over the north-west of Ireland, a district where in most years it is unknown. The Painted Lady (*V. cardui*), which is generally to be found in the same seasons as *V. atalanta*, has been, as far as I know, absent. I observed a Humming-bird Hawk-Moth (*Macroglossa stellatarum*) hovering over a scarlet Geranium in the garden here.—W. SINCLAIR, Strabane.

Lepidoptera at Enniskillen.—Lieut.-Col. Partridge gives (*Ent. Mo. Mag.* Dec. 1893) an interesting list of 283 species of lepidoptera from this district.

Irish Coleoptera—Remarks.—Mr. Tomlin's experience last summer at Port Ballintrae is quite parallel with mine at Courtown:—great abundance of *specimens* in certain cases, but great paucity of *species*. About 1,200 species of beetles have now been put on the Irish list, and new records are being made every year, owing to the recent increase of interest in local entomology. Beetles, however, are distributed with considerable irregularity, and it is not easy in the space of a summer holiday to compile a large list for a particular district. For instance, *Helops pallidus* occurs at roots of bent on the sandhills at Courtown, but I failed to find it after much searching on the sandhills of south Louth; *Chrysomela hyperici* is absent from the St. John's-worts of south Louth, but abounds at Courtown on *Hypericum dubium* and *H. perforatum*; *Nebria complanata* is abundant at Courtown, but absent in Louth; on the other hand *Dichirorichus pubescens* and *Phaleria cadaverina* are abundant in Louth, but I could not find them at Courtown;—yet the general features of both localities are almost identical. Mr. Tomlin's list contains some interesting species, one or two of which, e.g. *Bradycellus harpalinus* and *Helophorus rugosus* are quite familiar to me, but he is hardly safe in taking Canon Fowler's work as a guide to Irish records. It is not quite up to date. Thus within the last four years I have taken various species, such as *Pogonus littoralis* and *Pocadius ferrugineus*, not credited to Irish localities by Fowler, Rev. W. F. Johnson, F.E.S., and others, notably Mr. J. N. Halbert, have added, and are constantly adding, new and valuable records to our Irish list.—H. G. CUTHBERT, Blackrock, Dublin.

MOLLUSCS.

Hyalinia helvetica, Blum.; An addition to the Irish Fauna.—In November, 1892, I collected, at Whitegate, Co. Cork, a series of shells belonging to a form of *Hyalinia* which did not agree with any British species of which I had seen descriptions. In June, 1893, I sent specimens to Dr. Scharff, who informed me that he had found at

Bantry a few days previously a *Hyalinia* of the same form. Specimens were then submitted to Prof. Boettger of Frankfort and Dr. Westerlund of Ronneley, Sweden, both of whom agree, as also does the original describer, in pronouncing it to be *Hyalinia helvetica*, Blum. This species is new to the Irish Fauna, but it has been found in Switzerland, and according to Mr. Westerlund also in Brittany. As both he and Prof. Boettger assert that they possess English specimens of this species, it may be the *Hyalinia glabra* of English authors (distinct from *H. glabra*, Stud.) At Whitegate it appears to be very scarce, but Dr. Scharff says that at Bantry it is common. The shell is about the size of *H. cellaria*, but the umbilicus is much narrower (for description see *Nachrichts bl. Malak. Ges.*)—R. A. PHILLIPS, Cork.

BIRDS

Feather Ornaments.—"A Lover of Nature" writes as follows to the *Irish Times*, and his remarks are well worthy of the serious attention of our readers:—Will you allow me to call the attention of your readers to a letter by the clever author of "The Naturalist in La Plata," Mr. W. H. Hudson, in the *Times* of October 17th, and now reprinted by the Selborne Society, urgently expressive of the thoughtless cruelty of those who wear, or encourage the use of, stuffed birds, wings, and "ospreys" in millinery, and other decoration. Not only is it a useless waste of life, but if this fashion continues much longer the next generation may bitterly tax us with the destruction of the whole race of these beautiful gifts of nature. Already the white herons which supply the "osprey" feathers are entirely exterminated in Florida, where a few years ago they congregated in flocks for the breeding season (in 1887 I saw them there myself), and the lovely, crimson-throated humming birds are practically extinct throughout North America. And is this any marvel when we consider that for 25 years the custom of wearing birds has existed, and "nine years ago it was estimated that 20 to 30 millions of birds were annually imported to this country to supply the demand." Will not the ladies who are thus ruthlessly despoiling nature of its gems and thoughtlessly flaunting cruelty, stop ere it is too late, and show that they love beauty for its own sake and not merely as the conventionalities of fashion dictate, and so refuse to buy hats and bonnets decorated with birds and "ospreys"? Surely it is want of thought not want of heart that keeps up this cruel fashion.

The Garden Warbler in Ireland.—It will interest many of your readers to hear of the Garden Warbler (*Silvia hortensis*, Bechst.), being found in the Co. Cork. As far as I have been able to gather, it has not been observed in the county since 1852, when Mr. R. Parker, Sunday's Well, Cork, saw it on several occasions. I had been taking notes for years on birds, but accidentally burned them, so cannot say year for certain, but think it was in 1876 that I saw a cock Garden Warbler at Cuskinny, near Queenstown. I saw no hen about, but it might have been hatching at the time, though I saw no young ones later on. In 1888 I also saw a cock bird at Rockenham, Passage West, and the same remarks apply to it as the above. This year (1893) I had a good opportunity of observing the Garden Warbler at Monkstown, Co. Cork. I cannot be mistaken in the identity of this bird on these occasions, as I both saw it and heard it in Cheshire in 1880 and 1888 on numerous occasions, and also several times with an experienced ornithologist who was quite familiar with the species. This year, by standing concealed for a considerable length of time on several occasions in one position with an opera glass, I had a good view of the pair. On one occasion the pair flew almost into my face when the cock was chasing the hen rather ardently from some brambles —they had to turn aside to avoid flying against me, so I had a good view of them. The colours are more decided and in greater contrast than in the other warblers, being olive-brown above and white underneath.

They were often in the branches of deciduous trees with an undergrowth of shrubs, brambles, &c., amongst which they worked in and out and dropped out of sight the moment observed. They do not remain in the same spot long, and the only way to see them is to stay concealed *till they come to you* (this applies to many other birds), as otherwise they never give you a chance. Where this pair was there is a good deal of shrubs and undergrowth of brambles, &c., below the trees. The cock has rather an intense way of singing, and it comes in a volley, and is very loud for so small a bird, and has a resemblance to the song of the thrush and blackbird, but more spasmodic and snatchy; and the notes seem to burst out of him, and when he gives a short song he generally flies off to another part of the tree, or to another tree or shrub. The song ceased about 24th June. I tried to find nest, but did not succeed; I believe it was in a place I had not access to.—J. Crosbie Smith, Monkstown, Co. Cork.

White variety of the Sparrow (Passer domesticus) in Co. Galway.—On the 11th November, Mr. P. Collis Johnston, of Folena, Co. Galway, secured a very fine specimen of a white Sparrow, which can be seen at the establishment of Messrs. Williams and Son, Dame-street, Dublin.—J. H. Johnston, Armagh.

Crossbills (Loxia curvirostra) in Co. Cork.—In November, 1887, I heard the unusual sound at this season of the crackling of the fir cones (in the heat of the summer the cones burst open with a crackling sound and the seeds fly out). Though I had never seen a Crossbill before, I said to myself "Crossbills," and sure enough when I looked up at the fir-trees, I saw a lot of Crossbills at work on the cones. There must have been hundreds, and they continued, on and off, about the district till the spring, and remained, as far as I knew, till end of June, when I went away and did not return till October, when they had all disappeared, and I never observed any since. I knew of thirteen nests about the Monkstown (Co. Cork) district, and I feel sure there were many others, as I saw more birds than nests, and I also saw Crossbills at Ballybricken, Coolmore, Currabinny, Carrigaline, &c. The nests were in the upper branches of pines and firs, and were mostly on the outer end of the branch, and were all inaccessible except to a very good climber, but I saw the parent birds frequently about the trees and nests, and that satisfied me as to the fact of their nesting. My own belief is that many birds are not so rare as supposed, simply because we do not happen to see them, and as there are so few observant ornithologists, many rare birds must pass unnoticed. Some of the rarest birds that have visited our island were secured by the merest accident, as one may see by the various accounts written on the subject, and by what many know by their own experience. These Crossbills were noticed by several other people.—J. Crosbie Smith, Monkstown, Co. Cork.

Supposed Woodpecker in Co. Dublin.—One day about the middle of November, while driving between Lucan and Knockmaroon, Co. Dublin, I saw a black and white bird that was new to me. It flew across the river Liffey and alighted on a tree in Woodlands demesne. On describing it afterwards my husband said it was probably a woodpecker, and after looking at the woodpeckers in the Science and Art Museum I think there is no doubt that the bird was a woodpecker, but of which species I am unable to say.—Jane W. Shackleton, Lucan.

Bittern (Botauris stellaris, L.) in Co. Wexford.—A Bittern was shot, last March, near Drinagh, close to Wexford, by Mr Wheelock of that town for preservation. I have been unable to see it, but it was seen by Mr. J. H. Gurney of Keswick Hall, Norwich.—G. E. H. Barrett-Hamilton, Kilmanock, New Ross.

Little Auk in Co. Sligo.—When walking on the Enniscrone sands, on November 19th, I picked up the remains of a Little Auk, *Mergulus alle*, destroyed by the gulls. It was in a perfectly fresh state, however, and had evidently come ashore but a few hours previously. Along the same

sands I also found several Puffins, Razorbills, and Guillemots, all driven ashore by the N.W. gale of the two previous days.—ROBERT WARREN, Ballina (in *Zoologist* for January).

Great Shearwater in Killala Bay, Co. Mayo.—In the *Zoologist* for January, Mr. R. Warren writes, that on 23rd April last, he watched a flock of eleven Great Shearwaters (*Puffinus major*) fishing near the pier-head of Enniscrone. He remarks that he never previously saw them on the Irish coast in April, and suggests that they may possibly breed on some part of the sea-board.

OBITUARY.

JOHN TYNDALL.

THE death of Tyndall on December 4th, at his house, at Hindhead, Surrey, removes from the world of science one of the most famous Irishmen of the century. He was born at Leighlin Bridge, Co. Carlow, in 1820. After serving on the staff of the Ordnance Survey, and practising as an engineer at Manchester, he began his purely scientific work in 1847, as teacher of physics in a Hampshire school. Thence he proceeded to Germany, where he studied at Marburg under the celebrated Bunsen, and aftewards at Berlin. Physical investigations of great value then made him famous, and on his return to England in 1853 he was appointed professor at the Royal Institution, where he worked in company with Faraday. He resigned his appointment in 1883, since which time he has lived either in Switzerland or in Surrey.

It would be inappropriate, in this Magazine, to dwell upon the purely physical researches which formed the greater part of Tyndall's scientific work. At several points, however, his work touched the domains of natural science. He was one of the most daring of Alpine climbers, and during his holidays in Switzerland, he made the classical researches upon the motion of glaciers, which must always guide our speculations as to the action of ice in past ages of the earth's history. He was also a pioneer in the study of the minute organisms which we know generally as bacteria; his researches, carried on in the pure air of his Alpine retreat, proved that these humble forms of life are developed from living germs, and that their origin from dead matter must remain a matter for speculation. But Tyndall's best-known service to biology was his popular advocacy of the evolution theory. His power of clear exposition, and his Celtic imagination and eloquence, which made his physical lectures and books so popular, came to the aid of the evolutionists in the great conflict which followed the publication of the "Origin of Species" in 1859. One of Tyndall's most powerful strokes in this conflict was made on Irish soil, when, in 1874, he presided over the British Association at Belfast, and delivered the address which roused such a storm of opposition in some quarters. Tyndall's metaphysical and anti-theological speculations which largely caused this opposition need not be discussed here. It is recognised, by this time, that the student of nature may accept the physical and biological positions of the dead master without committing himself to those.

G.H.C.

SHELL-MOUND AT ROSAPENNA HOTEL, CO. DONEGAL.

From a Photograph by Mr. R. Welch.]

The Irish Naturalist.

Vol. III. MARCH, 1894. No. 3.

SHELL-MOUNDS AT ROSAPENNA, NORTH DONEGAL.

BY W. H. PATTERSON, M.R.I.A.

I VISITED Rosapenna in July, 1893, and had an opportunity of spending a little time among the sand-dunes there. The great strand, Tra-More, at the head of Sheep-haven, is the western boundary of the dunes, which are here about two miles in length, while they extend backwards from the sea, till a part of them touches the waters of Mulroy Bay; in fact, but for these sand-hills, it seems that the waters of the two bays would meet, and that Rosapenna and Rosguill, which now form a peninsula, would be an island.

These sand-dunes at Rosapenna must have been a favourable dwelling-place, or at any rate a favourite camping-ground with an early race of people. In many places among the dunes the shell-mounds, or kitchen-middens, of the old people are found, in most places broken down by the winds, and their contents scattered, and bleaching on the sand. Some portions of shell-mounds may still be seen undisturbed, and their contents, thrown together by the old people, can still be handled. Sand and wood-ashes, mixed with shells of edible species of mollusca, and bones of all sizes, including numerous large teeth, make up the bulk of these mounds. The bones in the mounds are brown and damp, while those that lie on the surface are dry and white, owing to the action of the sun and weather. The shells also have darker and fresher colours than those which have long since been scattered about.

Mr. S. A. Stewart has been good enough to name the shells which I put before him; these were collected hurriedly, and I feel sure do not represent all the species common in the mounds; most, if not all, of these were present in great numbers:—*Patella vulgata, Cardium edule, Littorina litoria, Mytilus edulis, Ostrea edulis, Pecten opercularis, Pecten maximus, Buccinum undatum, Solen siliqua, Cyprina islandica, Lutraria elliptica, Purpura lapillus, Venus verrucosa.* Mr. Stewart adds:—"*Venus verrucosa* is a southern species, and has not, I believe, been found as a recent shell in the North of Ireland. It is not uncommon on the southern and western coasts of England and in the Channel Islands, and also in the south-west of Ireland. It lives at five to ten fathoms on a sandy bottom. It is plentiful in Clare, and is said to be used there as food."

In the shell-mounds, the Limpet and Periwinkle (locally called Wilk) were by far the most numerous, outnumbering all the other species together. Many of the shells were of exceptionally large size, while all were mature specimens. In one hollow place there was an extraordinary accumulation of the shells of *Lutraria*, but all broken into small pieces, and three or four large stones, which probably served as the blocks upon which they were broken, were in and near the heap.

The Mussel-shells, which were numerous, were much decayed; this shell seems to be more perishable and to break up more easily than any of the others named. The claws of a large crab (*Cancer pagurus*) were among the specimens submitted to Mr. Stewart. I saw many other fragments of the shells of crabs, but they were all in a crumbling state.

The bones of large and small animals were literally in thousands; the box of those which I brought to Belfast has not yet been carefully examined, but the more apparent bones are those of the Ox, Horse, Sheep, Pig, Dog, and Red Deer; many jaw-bones were quite perfect, while great numbers of large teeth were scattered everywhere; the long bones were generally split lengthwise for extraction of the marrow. One blade-bone had been deeply cut with some sharp tool. Birds' bones were common, and an awl or spear-head made from the leg-bone of a large bird, and ground to a sharp point, was found. A few fish-bones were mixed with the shells, &c., showing that the people had the art of fishing.

Works of art among the shell-mounds were exceedingly few: there was a total absence of pottery, also of flint; not even chippings were found, nor any of the axes so common in the Danish shell-mounds. I was shown an ancient glass bead, and several quern-stones or hand-mills, found in the sand-hills; also two beautiful bronze pins or brooches, one of which was found by the manager of the Rosapenna Hotel, the other by Mr. Robert Bland: these may have been 10th century. A small portion of a bone comb was given to me: it is similar to combs found in Irish crannogs, and may not be older than 1600–1700, A.D.

I observed a large quantity of pieces of furnace slag, showing that at some period the smelting of iron-ore was carried on here. I found some portions of a human skeleton, including parts of the skull, and a good number of the teeth, some loose, and some still in their sockets; the teeth were perfectly sound, but were worn down quite flat, evidence that much gritty matter, either sea-sand or grit from the quern-stones, had been mixed with the food used.

From the number of bones of animals which must have been domesticated, it would seem that these people were not of a very primitive race; on the other hand, the absence of pottery would point to a very early period. Probably further investigations may lead to discoveries which will settle whether the people who formed the shell-mounds, belonged to the earlier or later stone age, or perhaps to some other defined period.

The illustration (Plate 3) which accompanies this paper shows a portion of the Rosapenna sand-dunes near the new hotel, where the wind is cutting into the ancient mound and laying bare its contents; it is from a photograph by Mr. R. Welch, Belfast.

NOTES ON THE FLORA OF THE NORTH-EAST OF IRELAND.

BY SAMUEL A. STEWART, F.B.S.EDIN.

(*Concluded from page* 38.)

Solidago virgaurea, Linn., var. **angustifolia** Gaud.—Plentiful and characteristic on rocky banks of Shimna River in Tollymore Park, and by the Bann above Hilltown, S. & P.

Bidens cernua, Linn., forma **radiata** is plentiful at Carrickmannan Lake, near Saintfield, S.A.S., 1893. Quoile marshes, Downpatrick, R. Ll.P., 1892.

Saussurea alpina, DC.—One spot only, on Slievemuck, Mourne Mountains, at 2,000 feet, S. & P. A few plants growing on dripping rocks, but they seem to produce neither flowers nor seed. Not known elsewhere in district 12.

Arctium minus, Schkur., var. **majuscula** Hartm.—Base of cliff at Bankheads, near Larne, S. A. S., 1873, and waste ground at Larne, S.A.S., 1876. The specimens referred to above were submitted to Herr Murbeck, the able Scandinavian botanist, who has specially studied the genus *Arctium* or *Lappa*, and are the first certainly ascertained plants from this district referable to this species. The authors of "Flora N. E. Ireland" did not include *A. minus* in their lists, as at that time no North of Ireland specimens had been determined on sufficient authority. Herr Murbeck considers that *A. nemorosum*, Lej., and *A. intermedium*, Lange, are synonymous, and if so one of those names must be deleted from our local flora.

Carduus crispus, Linn., var. **acanthoides,**—Killowen, Co. Down, S. and P. Mr. Praeger has refound this plant at Larne.

Carduus pratensis, Huds.—Several stations in the Mourne Mountains, S. and P. The only other record for Co. Down was considered doubtful.

Leontodon hirtus, Linn.—Dalchoolin near Craigavad, 1892, and Narrow-water, 1893, R. Ll. P.

Hieracium euprepes, Hanb.—I met with this plant on the Cave Hill, near Belfast, in 1877, and specimens collected then, and subsequently, were sent to Mr. Backhouse, of York, for identification. After a correspondence, which lasted for some years, he finally advised that my plant should be put as a form of *H. pallidum*, and when preparing the "Flora N. E. Ireland" this course was adopted. Mr. Hanbury of London, our present authority on British *Hieracia* has, however, met with and studied the same plant in Great Britain, and has raised it to the rank of a species under the above name. Mr. Praeger informs me that Mr. Hanbury has specimens of this hawkweed collected by the late Dr. Mateer, of Belfast, on the Cave Hill in 1845. They are in the herbarium formed by the late Dr. Boswell, now included in the Hanbury herbarium. The distribution in Ireland, as at present known, is on limestone or basaltic rocks almost entirely. Cave Hill and Sallagh Braes, Co. Antrim, S.A.S. Boulder clay bank, Milltown, Co. Antrim, Dr. W. A. Shoolbred, 1893. Basaltic cliffs of Benevenagh, Co. Derry, S.A.S.

Hieracium anglicum, Fries.—Frequent in Mourne Mountains, S. and P.

Var. **acutifolium**, Back.—By the Shimna above Tollymore Park, and by a stream on Luke's Mountain near same locality, S. and P.

Var. **longibracteatum,** Hanb.—Garron Point, and Glenariffe, Co. Antrim, Dr. Shoolbred, 1893.

[*H. pallidum*, Fries. The Antrim and Derry localities for this species have mostly been transferred to *H. euprepes*; the remainder are doubtful.]

H. argenteum, Fries.—Cliffs of Eagle Rock (Slieve Donard), Bencrom, and Cove Mountain, in Mourne range, plentiful, and sparingly by the Shimna River in Tollymore Park, S. and P. The *H. argenteum* of Broughnamaddy has been described by Mr. Hanbury as a new species under the name of *H. hibernicum*.

H. rubicundum, Hanb.—Sallagh Braes, Co. Antrim, S.A.S. The only other Irish station yet known is in Co. Donegal (Hart).

H. Farrense, Hanb.—Sallagh Braes, S.A.S. Not found elsewhere in Ireland.

H. stenolepis, Lindeb.—Plentiful on Cave Hill, Knockagh, and Sallagh Braes, Co. Antrim, S.A.S.; Garron Point, Co. Antrim, and Benevenagh, Co. Derry, Dr. Shoolbred, 1893. First recognised as Irish from specimens collected on Cave Hill by R. Ll. P. in 1886.

H. flocculosum, Back.—Basalt rocks of Sallagh Braes, Co. Antrim, S.A.S., 1886. A new county record.

H. bifidum, Tausch.—Benevenagh, Co. Derry, Dr. Shoolbred, 1893. First Irish record.

H. Schmidtii, Tausch.—Granite cliffs of Bencrom, Mourne Mountains, S. and P. The only station in district 12 at present known.

H. Friesii, Hartm., var. **Stewartii**, Hanb.—A remarkable form found sparingly in Tollymore Park, and abundantly on rocky banks of the Bann above Hilltown, S. & P. The only British station. This plant was recorded in "Botany of the Mourne Mountains" as *H. Friesii*.

H. hibernicum, Hanb.—Very sparingly on rocks at Broughnamaddy, Mourne Mountains; H. C. Hart, 1883; S. A. S., 1888; and S. & P., 1890. This plant was mentioned, under "*H. vulgatum*," by Mr. Hart in *Proc. Roy. Ir. Acad.* in 1884. It was recorded in *Jour. Bot.*, 1886, and in *Flora N.E.I.* in 1888 as *H. argenteum*. Mr. Hanbury has shown that it is distinct, and has named it as above. The only other certainly ascertained station is in Donegal (Hart).

H. crocatum, Fries.—Cliffs of Pigeon Rock Mountain, Mourne range, and by Shimna and Spinkwee Rivers, Tollymore Park, S. and P.

H. auratum, Fries.—Frequent throughout the Mourne Mountains, S. & P. Many of the plants hitherto classed under *H. corymbosum* must now be referred to this species. In Antrim it has been found on shores of Lough Neagh at Cranfield, S.A.S., and cliffs by the sea at Cushendun, R. Ll. P.

Lobelia Dortmanna, Linn.—Abundant in lakelet on summit of Binnagee (1,100 ft.), near Carnlough, Co. Antrim, R. Ll. P.

Vaccinium Oxycoccos, Linn.—Marsh at Saul Camp, Downpatrick, also by a lakelet near Carnlough, Co. Antrim, and on margins of Lough Ouske, Co. Derry, R. Ll. P. New to Antrim.

Mertensia maritima (Linn.), Don.—Refound on strand between Portrush and Portstewart, Co. Derry, by Mrs. Leebody, 1893.

Myosotis collina, Hoff.—Shane's Castle, Co. Antrim, R. Ll. P., 1891. Sandy warren at Portstewart, Co. Derry, Miss Davies, 1890. Not previously recorded for Derry.

Hyoscyamus niger, Linn.—Plentiful on distillery rubbish heap at Comber, Co. Down, S.A.S. Imported with grain.

Orobanche minor, Sutt.—Abundant in a field by the sea at Craigavad, H. C. Marshall, 1892. Imported with seed.

Linaria repens, Ait.—By a *lapsus* this was printed in *Flora N.E.I.* as *L. minor*. It is abundant near Killowen, and on the lower slopes of Spelga Mountain, Co. Down, S. and P.

Melampyrum pratense, Tournefort, var. **montanum.**—Frequent in Mourne Mountains at 1,400 to 2,394 feet, S. and P.

Erinus alpinus, Linn.—Wall of Downpatrick Goal, R. Ll. P., 1890. A plant of the Pyrenees established here, but not found elsewhere in Ireland.

Veronica polita, Fries.—Waste ground near the tramway station, Bushmills, Co. Antrim, S.A.S., 1893.

Mentha sativa, Linn. var. **paludosa**, Sole.—Limavady Junction, Co. Derry, Mrs. Leebody, 1893 (fide A. Bennett).

[*Calamintha officinalis* has been long extinct at our only station, Glendun River.]

Lamium hybridum, Villars—Fields at Killowen and Glasdrumman, Co. Down, S. and P.

Galeopsis speciosa, Miller.—Field at Six Road Ends, Conlig, Co. Down, S.A.S., 1893. Garron Point, Glenariffe, and Cushendun, Co. Antrim, R. Ll. P., 1892.

Stachys betonica, Linn.—Refound by the Bann at Kilrea, Co. Derry, Mrs. Leebody, 1893.

Utricularia intermedia, Hayne.—Peat bog at Rasharkin, Co. Antrim, "Cybele Hibernica." Overlooked when compiling the "Flora N. E. I."

[*Primula veris*, Linn., must be removed from list of native plants. It is not now found at Rostrevor.]

Hottonia palustris, Linn.—Everogue Bridge, as ascertained by Mr. Praeger, is at Crossgar, not Downpatrick, and Mr. Praeger finds that the plant still grows in this, its original station.

Anagallis arvensis, Linn., var. **cœrulea,** Schreb.—Wayside at Stranmillis Road, Belfast, Rev. John Andrew.

Beta maritima, Linn.—Portavo and Millisle, Co. Down, also Whitepark Bay, and Kenbane Head, Co. Antrim, R. Ll. P. Downhill, Co. Derry, Mrs. Leebody, 1891. No previous record for Derry.

Atriplex farinosa, Dumort.—Redbay, Cushendun, and Bushfoot, R. Ll. P. New to north Antrim.

Polygonum Raii, Bab.—Redbay and Ballycastle, R. Ll. P., 1890.

Callitriche autumnalis, Linn.—In the river at Bushfoot, Co. Antrim, 1888, and in the Bann at Toome, 1893, R. Ll. P. New to Co. Antrim list.

Salix purpurea, Linn.—Marsh near Moneyscalp, and roadside east of Crotlieve Mountain, Mourne range, S. and P. Near Holywood, and Craigavad, Co. Down, R. Ll. P. New county records, but stations for this ornamental willow are often suspicious.

Populus tremula, Linn.—Native on cliffs south of Blue Lough, Mourne Mountains, S. and P. New to Down flora.

Orchis pyramidalis, Linn.—About a half-dozen of plants on chalk rubbish at Magheragall quarries, Lisburn, Co. Antrim, R. Ll. P., 1888. In some abundance at east end of Magilligan Strand, Co. Derry, Mrs. Leebody, 1892.

Gymnadenia albida (Swartz), Rich.—Conlig Hill, Co. Down, R. Ll. P., 1891. Glenariffe, Co. Antrim, Rev. S. A. Brenan. This plant was found by Rev. W. M. Hind on Squires's Hill, near Belfast, more than thirty years ago; it has been refound there by Mr. W. H. Patterson in 1893.

Habenaria viridis, R. Br.—Kilbroney valley, and shore north of Annalong, Co. Down, S. and P.

H. bifolia, R. Br.—Kilbroney and Annalong, S. and P. By Enagh Lough, Co. Derry, Mrs. Leebody, 1892.

Listera cordata, R. Br.—Many stations in the Mourne Mountains, S. and P.

Neottia nidus-avis, Linn.—Wood above Bellarena station, Co. Derry, Mrs. Leebody, and B.N.F.C.

Spiranthes Romanzoviana, Cham.—A number of plants by the Bann, near Kilrea, Co. Derry, Mrs. Leebody, July, 1893. Northern botanists were startled by Mr. Praeger's discovery of this extremely rare orchid in Armagh. The announcement that Mrs. Leebody had met with it in County Derry came, therefore, as a further surprise. The flora of the north-east has been most unexpectedly enriched by this valuable addition.

Sparganium minimum, Fries.—In a small lake near Warrenpoint, Down, S. and P. Bog-holes west of Scawt Hill, Co. Antrim, R. Ll. P., 1887.

Typha angustifolia, Linn.—In Lough Neagh at the entrance of the Lagan canal, Co. Down, R. Ll. P., 1892.

Potamogeton nitens, Weber.—Annsboro Lake, Co. Down, and in the Sixmilewater near Antrim, S.A.S.

Cladium Mariscus (Linn.), R. Br.—Not yet extinct in Co. Down. A few plants still linger on marshy margin of Altnadua Lake, near Castlewellan, S. and P.

Carex muricata, Linn.—Marshy pasture between Springfield Road and the Forth River above Clowney Bridge, Belfast, Richard Hanna, 1893. Owing to encroachments of the builder, this plant will shortly disappear from this, its second station in the north of Ireland.

C. stricta, Gooden.—Abundant and luxuriant on several spots around Portmore Lough, Co. Antrim; also on islet on the Antrim side of Lough Beg, and on the Derry side of the Bann below Toome, R. Ll. P., 1893. These records make an addition to the flora of Derry, and remove all doubt as to the correctness of Templeton's statement of its occurrence at Portmore, almost a century since.

C. aquatilis, Wahl.—Plentiful in a deep drain in Shane's Castle Park, R. Ll. P., 1891. There is no other station for this sedge in the north-east. It was only recognized as an Irish plant in 1883. See Mr. A. Bennett's paper in *I. N.*, 1892.

C. pallescens, Linn.—Tollymore Park, Co. Down, S. and P.

C. limosa, Linn.—Marsh at Saul camp, near Downpatrick, 1889, and margin of Lough Ouske, Co. Derry, R. Ll. P., 1892.

Alopecurus pratensis, Linn.—Donaghadee, Co. Down, S.A.S., 1892.

Milium effusum, Linn.—South of Rostrevor, Co. Down, S. and P.

Avena pubescens, Linn.—Dry places by the shore at Craigavad, Co. Down, R. Ll. P., 1893. The only certain Co. Down station.

Aira flexuosa, Linn.—Abundant in Mourne Mountains, S. and P.

[*Sclerochloa procumbens* has been destroyed in the small spot it occupied at Belfast by the paving of Albert Quay, where it formerly grew in a dense patch].

Schlerochloa rigida, Linn.—Sea-walls at Killough and Ardglass, Co. Down, 1892, and at Magheramorne, Co. Antrim, 1893, R. Ll. P. New to Co. Antrim.

Festuca sylvatica, Villars.—Abundant by the Shimna River in Tollymore Park, S. and P. It is thus certainly a Co. Down plant, but cannot now be found at Rostrevor.

Equisetum hyemale, Linn.—Several stations in the Mourne Mountains, S. and P. Banks of the Lagan at Edenderry, Co. Down, R. Ll. P., 1892.

Lastrea filix-mas (Linn.) Pers., var. **abbreviata**.—Eagle Mountain, Mourne Mountains, S. and P. Quite distinct as a variety.

[*Asplenium Adiantum-nigrum*, var. *acutum*, Bory. Through the researches of Mr. Praeger the mystery connected with Sherard's record of this fern has been elucidated. Original specimens are preserved in the Herbarium Sloaneanum in the British Museum, and in the Sherardian Herbarium at Oxford. The former specimen has been examined by Mr. Praeger, and the latter, on his behalf, by Prof. Vines. They prove to be referable to a barren plumose form of *Athyrium Filix-fœmina*, practically identical with the form known to fern-growers as "*kalothrix*"—S. and P.

Osmunda regalis, Linn.—The Royal Fern still lingers by Lough Neagh at Shane's Castle, R. Ll. P., 1891.

Chara contraria, Kuetz.—Brackish pools at Limavady Junction, Co. Derry, 1889, and Clandeboye Lake, Co. Down, 1891, R. Ll. P. An addition to the Ulster flora.

IRISH BUTTERFLIES.

The Lepidoptera of the British Islands. By C. G. Barrett, F.E.S. Vol. 1., Rhopalocera. London, L. Reeve & Co., 1893. Price 12*s*. Large edition, with coloured plates, £2 13*s*.

A Catalogue of the Lepidoptera of Ireland. By W. F. de V. Kane, M.A. *Entomologist*, 1893. (Introduction and Rhopalocera in March to September parts.)

Entomologists in Ireland will heartily welcome the appearance of these two works. The former is by one of the most experienced of British lepidopterists, who, during his residence on this side of the channel, did much to increase our knowledge of Irish insects. We could wish that a fuller account of the structure of butterflies and moths, with some notes on comparative insect anatomy, were to be found in Mr. Barrett's introduction. For instance, the student is not told that the sucking-trunk of a moth is formed by the modification of a pair of jaws. A distinct improvement upon the order of our usual British lists is adopted by Mr. Barrett in placing the "Blues" (*Lycænidæ*) immediately after the "Whites" (*Pieridæ*). We hope, however, that it will not be very much longer before workers at the British lepidoptera begin to use the late Mr. Bates' natural order of the butterfly-families, with the *Danaidæ* at the head, and the *Papilionidæ* near the end, just before the "Skippers" (*Hesperiidæ*). This order has been in use by workers at exotic butterflies for about twenty years past.

Mr. Barrett's descriptions of the various species and their varieties are excellent. We are glad to see that he does not think it necessary to coin a number of varietal names, though he describes and figures many striking aberrations, several of which are from Ireland. Notable among these is Mr. Russ's dark form of *Pieris napi*, from Sligo, approaching the continental alpine var. *bryoniæ*. Mr. Barrett has collected a mine of facts on the subject of variation, but he leaves it to others to propound theories in explanation thereof. From his own observations and the scattered records of many workers, he gives full accounts of the habits, time of appearance, &c., of each species, as well as details of the preparatory stages. Lists of past and present localities are full enough to enable us to trace the varying range of each insect. This, alas! in many cases has become more and more restricted, and it is to be feared that two of the finest English butterflies—*Aporia cratægi* and *Lycæna acis*—have gone the way of *Polyommatus dispar*.

Four species of butterflies are given established places on the British list by Mr. Barrett, on the strength of captures during the last few years. The most striking is an American immigrant—*Danais archippus*—which has occurred in southern and south-western England, and South Wales, and might well be expected to visit Ireland occasionally. The two new "Blues"—*Lycæna bœtica* and *L. argiades*—are south of England species, and might very likely be found near the south coast of Ireland. The new "Skipper"—*Hesperia lineola*—seems to have its headquarters in East Anglia, and is hardly likely to occur with us. The British list now numbers sixty-eight species, but one of these is certainly, and two others are probably, extinct.

Of these Mr. Kane inserts forty in his new Irish list. The necessity for a revision of Birchall's list of 1866 has long been felt, and we rejoice that the naturalist best qualified for the task has now begun it. Not only have numerous important, but scattered, records, and a vast amount of unpublished material to be added, but not a few erroneous entries have to be expunged. Mr. Kane tells us, in his introduction, that he has clear evidence of the wrong determination of certain of the species recorded by Birchall. As he remarks, it is of the greatest importance that these should be noted and struck off, that the workers of the future may have a good foundation on which to build. Though better known than any other group of insects, there is yet much to be discovered about Irish lepidoptera.

Forty-three species of butterflies were given as Irish by Birchall in 1866. Four of these—*Aporia cratægi*, *Vanessa polychloros*, *Lycæna astrarche* (*agestis*), and *L. corydon*—were withdrawn by him in 1873, but two others, *Vanessa c-album* and *Syrichthus malvæ*, were added. Both of these however are omitted by Mr. Kane; the latter appears to have been wrongly identified, while the former was not captured, only observed—at a distance of several yards, as we have been told by one who was in company with the observer.

Another species in the 1866 list—*Nemeobius lucinia*—which rests upon unlocalised specimens in the Dublin University Museum, is also left out.

In place of these withdrawals, Mr. Kane has two species to add, both "fritillaries," *Argynnis selene*, recorded by Mr. Sinclair several years ago, and *A. adippe*. The latter, taken in Co. Galway, by Mr. R. E. Dillon, of Clonbrock, is a most interesting addition to our fauna. (Mr. Dillon has made still more startling discoveries among the moths, to which we hope soon to refer.) We noticed a record of *A. adippe* from Galway by Mr. G. A. Harker in the *Ent. Record* for October, 1892, and are glad to see the locality confirmed on such good authority as Mr. Kane's. Ranging, as it does, nearly all over England and into South Wales, this insect probably awaits collectors in other Irish localities. Thus Mr. Kane gives us forty species as Irish, and the recent discovery of *Pieris daplidice* (*I. Nat.*, December, 1893), raises this number by one, though this butterfly can be only regarded as a chance visitor, together with *Colias hyale*, *Argynnis latonia*, and *Vanessa antiopa*.

Five butterflies—*A. latonia*, *Melitæa athalia*, *Erebia epiphron*, *Lycæna ægon*, and *Hesperia thaumas*—have not been taken or seen by Mr. Kane or any of his correspondents, and still rest on Birchall's records of 1866. Though there is no doubt as to the correctness of these records, the re-discovery of the species is desirable.

The insect to which Mr. Kane devotes most space is *Melitæa aurinia* (*artemis*) of which he distinguishes two Irish varieties, which he names *præclara* and *scotica* (the latter form occurring also near Aberdeen and having received this name in recent English lists). Birchall's variety, *hibernica*, described in 1873 from Westmeath specimens, is practically abolished by Mr. Kane, who says that he has found only one example agreeing closely with Birchall's description, and that all Irish specimens come short of the size given by Birchall. It must be remembered, however, that in his time variety-naming had not become the fine art which it is at present. Birchall defined generally his var. *hibernica* as differing from the English insect in having "the fulvous spots largely replaced by white or cream-coloured blotches." This is a characteristic of both Mr. Kane's varieties, and it seems doubtful if new names were necessary.

In common with all naturalists in the country, we shall watch with interest the continuation of Mr. Kane's work, for which we owe him a debt of gratitude, and we hope soon to summarise his further publications. The appended list of Irish butterflies, abstracted from his, with a few supplemental localities will, no doubt, interest our readers, and will, we trust, lead them to consult for themselves his excellent work and that of Mr. Barrett.

In the list as given here, we venture to adopt the modern order of the families:—

SATYRIDÆ.

Erebia epiphron, Knoch.—Croagh Patrick.

Pararge egeria, L. } Common everywhere.
P. megæra, L. }

Satyrus semele, L.—Maritime counties.

Epinephile ianira, L.—Common everywhere.

E. tithonus, L.—Southern counties.

E. hyperanthes, L.—Widespread; often common.

Cœnonympha typhon, Rott.—Mountains and moors of Cos. Kerry, Cork, Mayo, Sligo and Donegal; midland bogs.

C. pamphilus, L.—Widespread and common.

NYMPHALIDÆ.

Argynnis selene, Schiff.—Has been taken once in King's Co.

A. latonia, L.—Once at Killarney.

A. aglaia, L.—Occurs round the coast:—Derry, Cos. Antrim, Down, Dublin, Wicklow, Waterford, Cork, Kerry, Galway.

A. adippe, L.—Co. Galway.

A. paphia, L.—Generally distributed in wooded districts.

Melitœa aurinia, Rott.—Widely distributed; most plentifully over the south of Ireland, but local:—Cos. Dublin, Wicklow, Carlow, Westmeath, Queen's Co., Waterford, Cork, Kerry, Limerick, Clare, Galway, and Sligo.

M. athalia, Rott.—Killarney.

Vaenssa urticæ, L.—Common everywhere.

V. io, L.—Common in parts of the south, rare in Ulster.

V. antiopa, L.—A few occurrences:—Belfast; Co. Tyrone; Co. Kerry.

V. atalanta, L. } Fairly common in the three southern provinces, rarer
V. cardui, L. } in Ulster.

LYCÆNIDÆ.

Thecla betulæ, L.—Munster; Co. Galway.

T. quercus, L.—Cos. Dublin, Wicklow, Cork, Kerry, and Galway.

T. rubi, L.—Southern counties, often abundant; Co. Armagh.

Polyommatus phlaeas, L.—Widespread; common in the south.

Lycæna ægon, Schiff.—Wicklow; Rostrevor.

L. icarus, Rott.—Widespread and common.

L. argiolus, L.—Generally distributed in wooded districts, where Holly is plentiful.

L. minima, Fues.—Widespread, but local.

PIERIDÆ.

Pieris brassicæ, L.—Widespread and common.

P. rapæ, L.—Widespread, but less common.

P. napi, L.—Widespread and common.

P. daplidice, L.—Once in Co. Wexford.

Euchloe cardamines, L.—Generally distributed.

Leucophasia sinapis, L.—Local:—Enniskillen; Co. Sligo; Co. Galway; Queen's Co.; Killarney.

Colias hyale, L.—Migrants occurred in the south in 1868.

C. edusa, Fab.—Occurs in certain years, generally in the south.

Gonopteryx rhamni, L.—Very local:—Co. Longford; Co. Galway; Killarney; Limerick.

HESPERIIDÆ.

Nisoniades tages, L.—Galway; Enniskillen; Co. Clare.

Hesperia thaumas, Hufn.—Cos. Wicklow and Cork.

H. sylvanus, Esp.—Wicklow, Killarney.

AMERICAN BIRD-VISITORS TO IRELAND.

BY W. E. PRAEGER, KEOKUK, IOWA.

VI.—The American Goshawk *(Accipiter atricapillus).*

This American bird has twice occurred in Ireland. One was shot in February, 1870, in the Galtee Mountains, Tipperary, and in the same year another was obtained in King's County. In the previous year it had been noted in Forfarshire, this being its only occurrence on the Sister Island.

The Goshawk is a winter visitor to the United States, and but few instances are recorded of its breeding south of the British possessions, though it does so regularly in some localities. Near Keokuk it is a rare winter visitant, and I have seen only about five birds of this species obtained near here in my ten years' observation. Early in February, 1888, one was shot by a farmer while it was devouring a chicken it had just killed. It was a very large and handsome female bird, and the most beautiful hawk I ever saw. The following winter two more were killed, which I saw after they had been mounted. A year later, I find my last note on this bird. On the 19th December, 1889, a friend of mine was out after Wild Turkeys, in some rough wooded land, a few miles north of this city. As he was standing on the edge of a small clearing he heard the crows making a great noise behind him, as though they were at their favourite amusement of mobbing an owl; a moment later, two hawks dashed out of the timber and over his head, and he brought them down handsomely with a right and left. The birds proved to be a splendid pair of Goshawks, and I even now break the tenth commandment almost daily as I pass the store window where they are displayed.

The Goshawk is perhaps the most rapacious of birds of prey, and were it more common in the settled parts of the country, the farmer would have a heavy score against it. But, save the wandering trapper, few white men know the Goshawk in his summer home, and neither Indians nor Eskimo are noted as poultry-fanciers. But if a Goshawk appears near a farmhouse trouble is sure to follow. For ferocious daring it has no equal among birds. Several cases are recorded of this bird's pursuing fowls even into dwelling-houses, where they sought in

vain the protection of man; of game just shot, carried off before the eyes of the sportsman; of newly-killed fowl carried away almost from out the hands of the poulterer. Bendire gives a case where he gave a Goshawk, that made a dash at some chickens, a dose of light shot; the wounded bird made off, but he had hardly slipped a new cartridge into his gun before it was back again after the chickens, but only to get a load of heavier shot that ended its career.

The Goshawk has strongly developed that characteristic human trait of killing just for the fun of the thing. One has been known to kill and tear to pieces five Ruffed Grouse in a single forenoon. Audubon records seeing one attack a flock of Grackles that were crossing a river, and strike five down before they could gain the shelter of the woods; the hawk then turned, and picking the disabled birds one by one from the water, carried them to a chosen spot on shore.

The contents of this bird's crop and stomach usually bear testimony to its destructiveness. By "destructiveness" we mean that it kills and eats some of those species that man considers of economic importance to himself—or in other words, *Accipiter atricapillus* comes into direct competition with *Homo sapiens* in the struggle for existence. The stomach is mostly well filled with remains of Grouse, Ptarmigan, fowl, Rabbits, or Squirrels. More rarely "vermin" are found, such as Mice, locusts, or beetles, while one occasion is noted when the bird had made a meal of a Weasel.

This hawk places its nest in a tree, usually at from 20 to 50 feet from the ground; it seems indifferent as to the species of tree selected. The nest is a rather rough and bulky affair, built chiefly of sticks. The eggs are from two to five in number, bluish white and unspotted, though sometimes slight brownish stains are noticeable. If the nest is approached, the bird will often defend it with great courage.

The Goshawk is readily distinguished from any other bird. Though such a good flyer, its wings are very short, at least for a hawk. Its size and proportions are unmistakable; a female will measure:—Length, 24 inches; wing, 14 inches; tail, 12 inches; as usual among hawks the male is somewhat smaller. It is not so easy, however, to distinguish the American from the European Goshawk, and I should want to carefully compare a specimen with other skins before deciding to which

species it belonged. The American bird has the back greyer and head blacker than the European, and the feathers of the breast and flanks are irregularly marked where, in the European bird, they are distinctly barred. Birds found west of the Rocky Mountains are very dark-coloured, and are usually considered as deserving recognition as a sub-species *(striatulus)*.

PROCEEDINGS OF IRISH SOCIETIES.

Royal Zoological Society.

Recent donations to the Gardens include a monkey from S. Cunninghame, Esq.; six Demoiselle Cranes from Dr. C. B. Ball; a Muscovy Duck from Mr. Evans; and a pair of Chilian Pintails from H. M. Barton, Esq.

The young female Chimpanzee, mentioned by Dr. V. Ball in his article in our January number (p. 3), did not long survive "Johnnie." Another female specimen has been acquired by purchase; she is named "Bella," and appears to be of a different race to her predecessors in Dublin, having a more hairy head.

Other recent purchases comprise a genet, a pair of silver-grey Rabbits, a pair of wild Turkeys, three Magellan Geese, and a male Yak.

2,320 persons visited the Gardens in January.

The Annual Meeting of the Society was held at Leinster House on January 30th. The Report then presented shows that the past year has been a successful one, having shown a considerable increase in the number of visitors, though there has been a falling off in the number of members. A most satisfactory addition to the buildings during the year has been the new outdoor aviary, which affords much pleasure to the birds by its spacious proportions, as well as to the visitors, who can watch their flight. The monkey-house is now undergoing improvements. Appended to the report are notices by Dr. V. Ball on lion-breeding in the Gardens and on lion-tiger hybrids.

Dublin Microscopical Club.

December 21st.—The Club met at Dr. M'Weeney's, who showed plate and tube cultivations (on obliquely solidified gelatine) of a micro-organism, the colonies of which possessed a most brilliant red colour, brighter even than that of *Bacillus prodigiosus*, the classic example of bacterial chromogenesis. The organism had been obtained from cultures of the pus of a large hepatic abscess. The patient was a young girl who had died of pyœmia in the Mater Misericordiæ Hospital. There was also found in the pus a second organism, the colonies of which were of a deep yellow colour. Neither the red nor the yellow organism liquified the gelatine; both grew much better at 37° C. than at 20° C. The development of pigment however was not observed at the higher temperature, nor in the absence of a large supply of air; but attained its optimum on gelatine plates that had been kept at room temperature nearly a month. The red organism refused to develop on potato. It consisted of excessively minute cocci, often in pairs The individuals were decidedly smaller than *Streptococcus pyogenes*. Minute abscesses in the lungs and spleen of

the patient contained similar cocci in close-packed colonies. It would be necessary to experiment further with this organism and its companion (a much larger coccus) before their biological position and their role in this particular case could be ascertained.

Mr. F.W. Moore showed *Dendrochium rubellum*. This fungus had not previously been recorded from Glasnevin. It was found growing on the decaying pseudo-bulb of an unnamed species of *Catasetum* which had been imported from Brazil. Specimens were sent to Mr. Massee, who identified it as the above-named species.

Prof. T. Johnson showed *Conchocelis rosea*, Batt., a perforating red alga, growing in the razor-shell (*Solen vagina*), &c. The specimens were found by the exhibitor in April this year on the shores of Dublin Bay. The genus was founded in 1892 by Batters, on material gathered at Milfort, Firth of Clyde, is the only floridean member of the "perforating algae", and is regarded as a member of the Bangiaceæ. He also exhibited *Schmitziella endophlœa*, Born. & Batt, an encrusting member of the Coralinaceæ, found growing in the substance of the cell-wall of *Cladophora pellucida* on the coast of Clare, three miles north of Kilkee. The monotypic genus represented by this endophytic red alga was founded by Bornet and Batters in 1892, and was recorded by them from the north coast of France, the south-west and west coasts of England. *Conchocelis rosea* and *Schmitziella endophlœa* are interesting additions to the marine flora of Ireland. A type-specimen of the latter, and the only existing illustrations of both, which the exhibitor owed to the kindness of Mr. Batters, were also shown.

Mr. M'Ardle exhibited a specimen of *Metzgeria conjugata* (Dill.) Lindberg, showing the autœcious inflorescence (*i.e.*, antheridia and the curious echinate calyptra on the same frond). The specimens of this rare and curious plant he collected in Ballyhaise wood, Co. Cavan, in October, 1893. This is a new locality for the species. It is interesting to note that this is the only species of *Metzgeria* which has the autœcious inflorescence; all the others known are dioœcious.

January 18th.—The Club met at Dr. W. Frazer's, who showed a specimen of sandstone with aggregated white accretions, usually of rounded form, the matrix being red; both materials were similar except in colour.

Mr. Greenwood Pim showed specimens of *Microsphœria comata* obtained from leaves of *Euonymus* on the Slane excursion of the Dublin Naturalists' Field Club last September. This species, which is new to Ireland, is remarkable for the great length of its conceptacle appendages.

Mr. F. W. Moore exhibited *Nectria bicolor*, B. and Br., an interesting and pretty fungus, which had been found growing on *Cœlogyne pandurata* in one of the hottest greenhouses in Glasnevin. *Cœlogyne pandurata* is a native of the swamps of North Borneo.

Prof. Cole showed sections of an iron-stained chert with brecciated structure. These were cut from a stone found six feet down in a bog in Co. Galway, the object being recognized by the local workmen as being of a most unusual character, and probably foreign to the district. The stone was brought for examination in Dublin by the Ven. Dr. Tait, Archdeacon of Tuam. One section has revealed a minute body that is probably a radiolarian, while organic structures occur in others. But the material is unsatisfactory owing to the amount of opaque hydrated iron oxide that it contains. Prof. Cole suggested that the stone was carried from some distant mineral vein by an ancient inhabitant of the district, and was lost in the bog, where it became embedded.

PROF. T. JOHNSON exhibited a fertile specimen of *Streblonema simplex*, (Crn.) Holmes and Batt., a brown alga discovered by the Cronans in 1867 on the north-west coast of France, subsequently by E. M. Holmes on the south coast of England, and by himself in September, 1891, at Kilkee (Co. Clare), and at Castletown-Berehaven (Bantry Bay) in May, 1893. The species is figured by Holmes in the *Journal of Botany* for 1887 (Tab. 274, f. 161). *S. simplex* forms small dark brown patches on *Codium tomentosum*, into which it sends creeping root-like filaments. The sporangi (plurilocular only known) are stalked, conical, obtuse, and confined to the basal part of the epiphytic tufts.

DR. M'WEENEY showed a number of curious pear-shaped hyaline structureless bodies which he had seen in the body cavity and muscles of a dead water-flea that had occurred in the sediment of Lough Dan water collected for analytical purposes last December. The greater part of the animal was filled up with these bodies, the regularity of whose shape and their tendency to be connected in pairs strongly suggested an organic origin. Their length was about 10-12 microns, their outline highly refractive, their narrow ends frequently united. He suggested that they might possibly be spores of some species of parasitic protozoon, and be comparable with the "pseudonavicellæ" of Gregarines and the pole-capsules of Myxosporidia. Numerous species of the latter group have recently been described, chiefly by Thélohan, as living in water-fleas, and these spores might possibly prove to belong to one of them.

Mr. DUERDEN exhibited specimens and sections of a new species of *Zoanthus* from the Bay of Bengal. The species is closely allied to *Z. sociatus*, Ellis, which is only known from the West Indies. The polyps in the species exhibited are club-shaped when contracted, and grow in clusters, the buds springing from the narrow bases of the polyps themselves. The body wall is smooth, and in some so transparent that the gonads and mesenteries can be seen through. The ectoderm is vacuolated, and has a "cuticula" on the outside, of the same nature as mesoglœa. This, along with the brown cuticle, is very dendriform in appearance. In this character and also in the basal canals of the mesenteries the species differs from its ally *Z. sociatus*.

MR. M'ARDLE exhibited a fertile specimen of *Scapania aspera*, Muller and Bennett, which he collected in some quantity in the oak-wood, near Ballyhaise, Co. Cavan; he also gathered the plant sparingly on Slieve Glah, a small mountain near Cavan, in October, 1893. These are the first Irish stations recorded for this liverwort, which is an addition to our flora. Mr. W. H. Pearson, who verified the Cavan specimens, collected it on Tower Hill, Abergele, Denbighshire; it is also recorded from several localities in England and on the continent (Sweden, Switzerland, Germany, Austria, and Italy.) Mr. M'Ardle also exhibited an excellent figure of the plant by Mr. Pearson, published in the *Journal of Botany*, vol. xxx., p. 353, tab. 329, December, 1892, and mounted specimens showing the habit of growth of the plant.

BELFAST NATURALISTS' FIELD CLUB.

JANUARY 16th.—The President (MR. WM. SWANSTON, F.G.S.) in the chair. The following papers were read:—Relative Antiquity of Rath, Cromleac, and Tumulus, as evidenced by some remains near Dromore, Co. Down, by JOHN M. DICKSON; Pre-historic Forts and Raths in the City and Vicinity of Belfast, by FRANCIS JOSEPH BIGGER; Notes on Forts in the Townland of Greenagh, near Downpatrick, by JOHN RUSSELL, C.E.

Dublin Naturalists' Field Club.

February 13th.—The President (Mr. G. H. Carpenter) gave a paper on the Irish Phalangida or "Harvestmen," illustrated by microscopical preparations shown in the optical lantern. The paper will shortly be published in the *Irish Naturalist.*

Dr. E. J. M'Weeney gave an account illustrated by test-tube specimens and microscopical preparations of the pure cultivation of Moulds, stating that he hoped by this means to bring to light a second method of reproduction in species where only one is at present known. A paper on the subject will appear in the *Irish Naturalist.*

A discussion followed, in which Mr. J. E. Duerden, Prof. Cole, and Mr. H. Ramage took part.

Mr. H. L. Jameson asked assistance from members of the Club in investigating the Irish Bats.

Limerick Naturalists' Field Club.

January 16th.—The Annual Meeting was held at 97, George-street. The Report presented by the Committee showed the Club to be in good condition, both as to membership and finances. The Officers for 1894 were elected as follows:—President, Mr. A. Murray; Vice-Presidents, Dr. Fogerty and Mr. E. Taylor; Treasurer, Mr. J. Stewart; Secretary, Mr. F. Neale; Members of Committee, Mrs. R. Gibson, Mr. H. Martin, and Mr. R. D. O'Brien. A series of very interesting lantern transparencies, kindly lent for the occasion by Mr. G. H. Carpenter of Dublin, and Mr. R. Welch of Belfast, were exhibited and explained, the subjects thus dealt with being Lepidopterous Larvæ, Birds' Nests, Geological Stratification, &c., Foraminifera and Diatoms.

NOTES.

BOTANY.

MUSCINEÆ.

Hepatics and Mosses from the Dundalk District.—The pleasant time spent on the long excursion last year will still be fresh in the memory of the members of the Dublin Naturalists' Field Club who took part in it. My own principal object was to investigate the mosses and hepatics of the district, no easy matter when the country and scenery is new, not to mention the interesting antiquities on the route, which claimed a large share of attention. I have before me in my note-book a rough sketch of the famous cromleac and dolmen of Ballymascanlan; these alone were worth going to see. The cover-stone of the cromleac measures twelve feet in length by six feet in breadth, and is estimated to weigh fifty tons, and about eight feet is the height of the supporting stones. Slieve Gullion looked dry and barren, so those interested in cryptogams collected along the lower slopes, which were more sheltered and likely to be productive of the plants we were in search of. Amongst others I succeeded in gathering *Cephalozia Lamersiana*, Huben, *Plagiochila spinulosa*, Dicks, *Nardia hyalina*, Lyell, and

Blasia pusilla, Linn. Amongst the *Cephalozia* I detected a few stems of *Scapania umbrosa*, Schrader, which must grow in some quantity at this station. These are rare and interesting liverworts, probably new to the locality. Amongst the mosses the best finds were *Orthotrichum crispum*, Hedwig, and *Hypnum scorpioides*, Linn. From the road near St. Patrick's Bridge we ascended Carlingford Mountain; piloted by Mr. Lloyd Praeger, we kept close to the course of a small stream. Amongst the rocks in sheltered places he pointed out to us the rare *Polypodium Phegopteris*, L., *Hymenophyllum Wilsoni*, Hook., &c. At the summit we had the benefit of Professor Cole's excellent lecture on the geology of the district; the spot was well chosen, as it presented ample material for demonstration. Amongst the liverworts collected was a fine purple form of *Scapania nemorosa*, Dumort. This plant is often referred to *Scapania undulata*, L., wrongly, I think; or there may occur purple forms of both species. *Riccardia multifida* grows sparingly in boggy places. On the last day of the excursion we descended the steep slopes of Ferry-hill, and crossed at Narrow-water to Major Hall's demesne. On the side of a bank near the pathway I gathered *Nardia crenulata*, Smith, *N. hyalina*, Lyell, and the obtuse-lobed form of *Jungermania turbinata*, Raddi. The total number of mosses collected or noted by me is 26; amongst the scarcer in the district I may mention *Tortula fallax*, Hedwig, on a bank by the roadside near Newry; *Amblystegium serpens*, Dill. and *Sphagnum rubellum*, Wils. on Carlingford Mountain. Of Hepaticæ I gathered 20 species; I have mentioned those which I believe are rare or new in the district. These numbers fall short of what one would expect for three days' collecting. I noted that on Slieve Gullion trees and wood of any sort are very scarce; it is on the fallen and decaying logs in sheltered, moist spots that the rarest liverworts and mosses luxuriate, and there we find them so abundant in the moist warm glens of the counties of Wicklow and Kerry, where in the same space of time I could at least have collected two-thirds of the known Irish liverworts and mosses. The labours of Mr. Templeton, of Belfast, and Dr. D. Moore amongst cryptogams in the northern counties are well known; it only remains for me to notice those of the present day. It is worthy of note that the copious and complete lists of these plants published from time to time by Mr. S. A. Stewart, of Belfast, the Rev. H. W. Lett, of Loughbrickland, and the Rev. C. H. Waddell, of Saintfield, Co. Down, show these three workers to be possessed of rare discriminating power, to acquire so large an amount of knowledge under such natural difficulties of climatal conditions of plant-life.—D. M'Ardle, Glasnevin.

A Moss (Hypnum confervoides, Brid.) new to Ireland.—Amongst a day's gatherings of Mosses and Hepatics made by me in August, 1893, in Altadore Glen, Co. Wicklow, I have found some fine patches of *Hypnum confervoides*, Brid., which is, in the words of Dr. Braithwaite, who confirms the find, "a good addition" to the Moss Flora of Ireland. So far as I am aware there is no previous notice of this plant having been found in the island.—H. W. Lett, Loughbrickland.

ZOOLOGY.

PYCNOGONIDA.

Pallene brevirostris, Johnst., and Ammothea echinata, Hodge, in Dublin Bay.—A collection of marine invertebrates, got by Dr. Scharff at the North Bull, after the severe gales of December last, included female specimens of these two pycnogons. They have not before been obtained on the Irish coast, though recorded from the shores of Norway, Holland, France, and Great Britain, the latter species occurring also in the Mediterranean.—Geo. H. Carpenter.

Anoplodactylus petiolatus, Kr., off the South-West Coast.—In my paper on Irish Pycnogonida (*Sci. Proc. R.D.S.*, vol. viii., p. 197), I was able to record only a single female of this species, from Loughrosmore Bay, Co. Donegal. Mr. J. E. Duerden has lately found several examples of both sexes which were dredged by the "Harlequin" in 55 fathoms off the mouth of Kenmare River, but which had been overlooked when the material from the survey was handed to me last year.—GEO. H. CARPENTER.

INSECTS.

Winter Larvæ of Vanessa atalanta.—In the *Entomologist's Record* for January, we notice a record that living caterpillars of the "Red Admiral" were taken at Skibbereen on Jan. 11th. It would seem that the mild autumn of last year caused an abnormal second brood.

Hymenoptera in Co. Dublin.—The following Aculeate Hymenoptera were among my captures in this county last summer. Social Wasps—*Vespa germanica*, abundantly; *V. sylvestris*, sparingly; and *V. norvegica*, in some numbers. Solitary Wasps—*Odynerus pictus* and *O. parietum*, abundantly; *O. parietinus*, less commonly; and *O. spinipes* once, at Killiney. Bees—*Megachile centuncularis* frequently; and *Cœlioxys elongata*, once. The latter curious species, parasitic upon *Megachile*, was taken in my garden here, in company with its host. Two other bees of this class, parasitic on the *Andrenidæ*, occurred at Foxrock—*Nomada ruficornis* and *N. succincta*. Of *Andrena* itself I met with no noteworthy species, except *A. fucata* at Skerries, but *A. Gwynana* was taken at Dundrum by my friend, Mr. Percy Freke.—H. G. CUTHBERT, Blackrock, Dublin.

MOLLUSCS.

Land-Shells at the Giant's Causeway.—Visitors to the Giant's Causeway will perhaps recollect a rather marshy bit of ground in Portnoffer, almost immediately below the "Shepherd's Path," which leads to the top of the cliffs. It is strewn with stones, large and small, and to a conchological eye suggests at once a happy hunting ground,—a suggestion, the correctness of which no collector should fail to test, if he has the chance. The dry summer of 1893 is hardly a fair season on which to base a comprehensive estimate of the district's land-shells, and I will only record a few interesting species that occurred in this spot at the Causeway. I might perhaps make an exception with regard to *Helix virgata*, as to the distribution of which in the north of Ireland I understand that special interest attaches. This species was plentiful by the side of the road leading down to the harbour at Ballintoy, but I saw it nowhere westward of that place, my researches extending to Port Ballintrae. *Helix ericetorum* and *Cochlicella acuta* were plentiful throughout. To return to Portnoffer—the best shell to be had there is certainly *Vertigo substriata*, and it is not uncommon, but a little villain to see. I found that the only plan was to lie amongst the reeds full length, and inspect at the closest possible quarters the rough surfaces of the boulders, turning down very carefully the grass and weeds round the edges. Some specimens of course were to be found on small, manageable stones, but the majority prefer the seclusion of the big, fixed blocks. *Vertigo antivertigo* was extremely scarce, *V. edentula* fairly common, but *V. pygmæa* occurred in profusion there as well as in other drier spots along the coast. It is easy however to recognize *substriata* from the rest by its paler yellow colour, and in fresh specimens the striæ are distinctly plain to the naked eye. The colour of the animal seems to be very pale indeed. *Pupa ringens* was fairly common, and I got a nice series of *Helix rotundata* v. *alba*. Perhaps the most abundant shell of all there is *Clausilia rugosa*, and it was at once noticed that nearly all the shells were

a very small variety—smaller than anything I have seen outside the Channel Isles. This small variety figures on our lists as var. *Everetti* (has this priority of var. *minor*, Moq.?), and it is interesting to find that Jeffreys specially quotes the Giant's Causeway as a locality for this variety. *Carychium* of course was in evidence, and several *Hyaliniæ*, the most noteworthy being *H. radiatula*.—BROCKTON TOMLIN, Llandaff.

AMPHIBIANS.

Introduction of the Common Toad into Ireland.—Some ten years ago about twenty live Toads were turned down here, but although, for a short time, one or two were to be found about the garden, it was only for a *very* short time, and none have now been met with for years. This note has been suggested by Dr. Scharff's assertion (in his paper on the Frog in Ireland) that "artificial introduction almost invariably fails." (*Irish Naturalist*, 1893, p. 3). Might I point out that the Caves of Ballynamintra are in the Co. Waterford, and not, as stated in Dr. Scharff's paper, in the Co. Wexford?—G. E. H. BARRETT-HAMILTON, New Ross.

BIRDS.

Our Autumn and Winter Migrants.—Rev. R. M. Miller sends us a popularly-written article on the above subject, which he recently (January 24th) contributed to the pages of the *Clonmel Chronicle*.

The Magpie (Pica rustica) in Ireland.—I have been much interested in Mr. W. F. De V. Kane's notes on the former scarcity of the Magpie in Ireland (*I. N.*, 1893, pp. 96 and 113), as they add slightly to the notes I have collected on the subject. Mr. Kane will find a paper on "The Introduction of the Magpie into Ireland" in the *Zoologist* (July, 1891, pp. 247-9).—G. E. H. BARRETT-HAMILTON, New Ross.

Jays (Garrulus glandarius).—As I am in want of a few Jays (both English and Irish) for purposes of comparison, might I ask readers of the *Irish Naturalist* who live in parts of the country where Jays are plentiful to kindly send me one or two specimens, the receipt of which will be at once acknowledged.—G. E. H. BARRETT-HAMILTON, Kilmannock, New Ross.

Green Sandpiper (Totanus ochropus) in Co. Tipperary.—On January 11th I received two birds for identification from Lough Derg. One was a Dunlin (*Tringa alpina*); the other an adult female Green Sandpiper, being the first I have seen in the flesh. Its stomach contained fresh-water snails and shells.—ROBERT PATTERSON, Belfast.

Little Auk (Mergulus alle) in Co. Sligo.—On the 27th December, 1893, I received a fresh specimen of the Little Auk. It was found alive inland about four miles from the sea, but died shortly after. Another specimen was shot on Lough Gill on the 29th of December, and came into the possession of Owen Wynne, Esq., Hazelwood, Sligo.—R. M'CLEAN, Sligo.

MAMMALS.

The Rabbit on the Irish Isles.—In answer to Dr. Scharff's query (*Irish Nat.*, 1893, p. 277), I may state that the Rabbit is found both on the Saltee and Keragh Islands, off the Wexford coast. In a letter dated September 18, 1889, Mr. M. J. Kennedy, then light-keeper at Inishtrahull, Co. Donegal, stated that the Rabbit was "the only animal that thrives well" on that island.—G. E. H. BARRETT-HAMILTON, New Ross.

Badger (Meles taxus) in Co. Tyrone.—"J.A.B." records in *Land and Water* for January 13th the capture of a fine dog Badger, at Beltrim, Co. Tyrone, and remarks that this animal is very rare in the county, only four captures having been recorded in the last five years.

The Irish Naturalist.

Vol. III. APRIL, 1894. No. 4.

IRISH BATS:

How to collect Specimens with a view to the Investigation of their Distribution.

BY H. LYSTER JAMESON.

Last year I printed and circulated a few papers on the means to be adopted for collecting Irish Bats, and, as the season of the year in which they are most readily procurable is now approaching, I would like to call the attention of the readers of the *Irish Naturalist* to the wide field lying open for investigation, in the distribution in Ireland of our few species.

Our knowledge of the range and usual haunts of the seven species that are at present known to inhabit Ireland is as yet extremely limited, to say nothing of their habits. Few people, except those living in the centres of towns, pass a summer without opportunities for procuring specimens of the Bat tribe, and such specimens are almost impossible to identify without trustworthy books and a series of skins and spirit specimens for comparison; as in many cases the specific characters are exceedingly minute. I therefore venture to put before the readers of the *Irish Naturalist* a short account of the most likely places in which to look for Bats. The Bats, or Cheiroptera, are nocturnal mammals, coming out from their sleeping-places at dusk to feed; all our Irish species are insectivorous, living principally on flies, which they capture on the wing. In the day-time they lie hid in dark recesses of buildings, caves, &c., and it is in these places that they are most readily procured. The archæological remains of Ireland no doubt harbour numerous Bats, but they

are in many cases extremely difficult to explore with any results; specimens in such cases can best be obtained through farm servants, &c., who may know the part of the building in which to search for them. Workmen engaged in pulling down or repairing buildings frequently meet with colonies of Bats. Churches afford also admirable quarters, particularly in the towers and roofs. I have myself found the Long-eared Bat *(Plecotus auritus)* hanging in clusters from the rafters of a church. Bats in such a situation hang with their heads down and their wings folded to their body, a position which is portrayed in many works on natural history. The roofs and other parts of houses are also liable to be frequented. When Bats are known to inhabit such a place as a hole in a wall, tobacco smoke puffed in will generally succeed in bringing them out. Old sheds and farm buildings, summer-houses, boat-houses, &c., are excellent hunting-grounds.

In felling old trees, Bats may be found in holes and crevices and under the loose bark; hollow trees often are the homes of colonies. Projecting shelves, holes, and other such places in caves are inhabited by some species; they may be found hanging from the roof and bare walls. Very often buildings and isolated hollow trees near a lake or river repay a visit. When on the wing at night, Bats frequently fly in at open windows. I captured four specimens this way last summer and autumn in my room at Killencoole. When Bats are on the wing at dusk a well-aimed charge of No. 8 (snipe) shot will sometimes secure a specimen. Some species, such as the Hairy-armed Bat, come out long before dusk. The neighbourhood of water, particularly a canal, or the deep still pools of a river, should be visited at dusk with the gun.

We have seven species of Bats in Ireland, representing four genera. Our largest species is the Hairy-armed Bat (*Vesperugo Leisleri*). This species, in my experience, is an early flyer; the specimens which I saw at Loughgilly, Co. Armagh, used to appear some time before dusk. The flight is more "go-ahead" and hawk-like than that of its next neighbour the Pipistrelle. It has been found sparingly in the eastern counties as far south as Wicklow.

The Pipistrelle (*Vesperugo pipistrellus*) is the common Bat of the British Isles, and is probably pretty generally distributed; its flight is extremely erratic.

The three members of the genus *Vespertilio* are all rare in Ireland; the Whiskered Bat (*Vespertilio mystacinus*) and the Reddish-grey Bat (*V. Nattereri*) inhabit houses, trees, and caves in England. Daubenton's Bat (*V. Daubentonii*) is also rare; it frequents the vicinity of water, and is likely to be found in old water-mills and bridges. This species skims along over the surface of the water, like a swallow, in pursuit of small insects.

The Long-eared Bat (*Plecotus auritus*) is common, and inhabits the roofs of houses and other buildings.

The last species, the Lesser Horse-shoe Bat (*Rhinolophus hipposideros*) is a cave dweller; it is rare and local in Ireland; the limestone caves of the West should be well explored for this species.

Specimens when procured, if alive, should be sent by rail, labelled perishable; if dead they can be sent by parcel post, but it is preferable to send by rail. The locality, situation, date, and name and address of sender should accompany each consignment of specimens. It is much better in most cases to put the specimens as they are captured into spirits, than to send single specimens by post in small packages; the tubes or bottles containing the spirit specimens can be sent then in a larger parcel by rail, or they can be taken out of spirits and sent safely in a tin box. The full data should be attached to each specimen when put in spirits, otherwise confusion may arise. If senders desire, I will present specimens forwarded to me for identification to the Science and Art Museum, Dublin, in sender's name.

It cannot be made too plain that it is impossible to identify Bats (except one or two species), without books and specimens for comparison; to senders who wish to make a collection, I will gladly return specimens when identified. I will willingly furnish any further particulars as to collecting and preserving to those who communicate with me. Tubes for spirit specimens can be had from Mr. Marsden, Bath.

There exists a strange idea that bats are noxious animals. It is needless to say that our Irish species are perfectly harmless; not one of them can inflict a bite sufficient to pierce the skin.

Killencoole, Castlebellingham.

POSSIBLE ARCTIC PLANT-BEDS IN IRELAND.

BY JAMES BENNIE,
Her Majesty's Geological Survey of Scotland.

It has been suggested to me that a summary of what I have got from Arctic Plant-beds in Scotland, and a description of where and how they occur, might be of advantage to students of nature in Ireland, as to where and how the same things might be got in that country.

WHAT HAS BEEN GOT :—Chiefly arctic plants of six or seven species, the most abundant being leaves of the arctic Willows —*Salix herbacea*, *S. reticulata*, *S. polaris*, *Oxyria digynia*, *Betula nana*, and *Dryas octopetala*, and associated with them, the remains of *Apus glacialis*, a crustacean now only known living in the land-lakes of Spitzbergen and Greenland. Of the arctic Willows the one in greatest abundance was *Salix herbacea*, which was in thousands upon thousands. *S. reticulata* came next, then *S. polaris*. *Betula nana*, though not rare, was comparatively infrequent, while *Dryas octopetala* was excessively rare, only about half a dozen leaves being got altogether. The *Apus* remains were comparatively abundant, indicating hundreds of individuals. Besides leaves, seed-cases were abundant. A few leaves of other plants occurred, and seeds of the ordinary water-plants—the pondweeds and the sedges were very numerous.

WHERE THEY OCCURRED :—In the bottom of old silted-up lakes, and generally in thin layers in silt or clay ; sometimes amongst other vegetable debris, and occasionally as single leaves in the silt. These old lake-deposits lie directly or nearly so upon Boulder clay, in the flat spaces or hollows between hillocks or mounds of that glacial drift ; and thereby we get evidence of the date of their existence. It must have been soon after the ice melted from off the land, and water became possible as water, to form pools in the hollows, and plants could grow on the hills or hillocks surrounding them. This date is confirmed by the characters of the Arctic plants, which are such as prove a climate 20 degrees colder than what prevails in the same places at present ; and also by the occurrence of the *Apus*, which is now found living only in Greenland and Spitzbergen.

The places where these lake-deposits with the Arctic plants and the *Apus* were got are Hailes Quarry, about three miles west of Edinburgh, and in a sewer-cutting through the old silted-up lake of Corstorphine, about four miles west of Edinburgh, the first being 150, and the latter 50 feet above sea-level. The deposits cut through at Hailes were 10 or 12 feet of sands and grits, with occasionally patches of peat, layers of vegetable drift-wrack, with pieces of drift-wood. At Corstorphine, 4 or 5 feet of sands, then marl with the ordinary lake-shells—*Cyclas* and *Planorbis* being the most common ; and the ordinary water-plant stems in such numbers that the marl was felted by them. At the bottom of each was the silt with the arctic plants, with the *Apus* remains interspersed in fragments.

Such is a bald statement of what was got in these old lake-deposits, but enough, it is hoped, to show that they are worthy of investigation wherever found, as by them we may know something of a land of which we know little—the land of the later times of the Glacial period ; a land on whose hills the only trees that grew were the creeping willows, and in whose waters the liveliest creatures were the crawling *Apus glacialis*.

A description of the methods by which these results were obtained will fitly close this notice.

If the plant-remains occur as layers in silt or clay, the matrix should be dried thoroughly, then crushed gently with the hand in a basin of water, when the silt will part readily from the leaves or debris—some of the leaves and seeds and mosses will float, but others will sink. When the silt is thoroughly melted or divided, allow the water to settle ; then pour it off into a sieve, and then as many of the leaves, &c., as floated will be got with as little breakage as possible. The remainder should also be sieved in the same way. Sieves of different meshes are useful, say from $\frac{1}{4}$ of an inch in width, to a fineness of 90 in a lineal inch. Sieves about 6 inches square and 1 inch in depth, made of tin, with a wire round the top, and the bottom turned inwards $\frac{1}{4}$ of an inch, to which the brass wire cloth should be closely soldered, will be found convenient.

If the leaves should be in peat, then the peat should not be dried, but taken soft as lifted, and crushed or bruised in water

in the same manner as the silt. The reason is that many peats grow so hard when dried, that they will not divide or melt at all; some, however, will crush if boiled for a time.

By means such as these the results described have been obtained without much trouble; and their application to the lake-silts or peats of Ireland should produce the same results.

AN ACCOUNT OF MEDIEVAL IRELAND, BY BARTHOLOMEW ANGLICUS (13TH CENTURY).

BY V. BALL, C.B., LL.D., F.R.S.

In the course of my researches among ancient authors regarding the productions and myths of India, I have from time to time met with accounts of various matters referring to Ireland, and it has occurred to me that the following extract, with explanatory notes, as a first contribution of this nature, may prove of interest to the readers of the *Irish Naturalist*.

The work of Bartholomew Anglicus, of which an epitome has recently been published by Mr. Robert Steele[1], was one of the most widely read books of medieval times. The author, an English Franciscan, produced this encyclopædia about the year 1260, in order to explain many then current allusions to natural objects, &c. Its popularity continued after the invention of printing, and numerous editions in various languages appeared in the 15th century.

OF HIBERNIA, CAP. LXXX.

"Yrlonde hight Hibernia, and is an island of the ocean in Europe, and is nigh to the land of Britain, and is more narrow and straight than Britain, but it is more plenteous place . . . . In this land is much plenty of corn-fields, of wells and of rivers, of fair meads and woods, of metal and of precious stones. For there is gendered a six cornered stone that is to wit, Iris, that maketh a rainbow in the air, if it be set in the sun (1) and there is jet found. (2). and white pearls. (3). And concerning the wholesome air, Ireland is a good temperate country. There is little or

(1) Medieval Lore, An Epitome of the Science, &c., &c., of the Middle Age, being gleanings from, &c., &c., of Bartholomew Anglicus (*De Proprietatis rerum*), Edited by Robert Steele: London, Elliot Stock, 1893, pp. 79-81.

none passing heat or cold, there be wonderful lakes, ponds, and wells. For there is a lake, in which if a staff or a pole of a tree be pight, and tarrieth long time therein, the part that is in the earth turneth into iron, and the part that is in the water turneth into stone, and the part that is above the water abideth still in its kind of tree. There is another lake in which if that thou throwest rods of hazel, it turneth those rods into ash: and ayenward if ye cast ashen rods therein, they turn into hazel. (4). Therein be places in which dead carrions never rot, but abide there always uncorrupt. Also in Ireland is a little island, in which men die not, but when they be overcome with age, they be borne out of that island to die without (5.) In Ireland is no serpent, no frogs, nor venemous addercrop, but all the land is so contrary to venemous beasts, that if the earth of that land be brought into another land, and spronge on the ground, it slayeth serpents and toads. Also venemous beasts flee Irish wool, skins and fells. And if serpents or toads be brought into Ireland by shipping, they die anon. (6).

"Solinus speaketh of Ireland, and saith the inhabitants thereof be fierce and lead an unhuman life. The people there use to harbour no guests, they be warriors, and drink men's blood that they slay, and wash first their faces therewith; right and unright they take for one . . . Men of Ireland be singularly clothed and unseemly arrayed and scarcely fed they be cruel of heart, fierce of cheer, angry of speech, and sharp. Nathless they be free-hearted, and fair of speech, and goodly to their own nation, and namely those men that dwell in woods, marshes, and mountains. These men be pleased with flesh, apples, and fruit for meat, and with milk for drink; and give them more to plays and to hunting, than to work and travail. (.7)."

(1) The term *Iris* was applied by Pliny to hexangular crystals of quartz, which, when placed in the sun, were capable of forming the prismatic spectrum on a wall. Another variety, esteemed by the ancients, owed its colours to the existence of internal fractures with which the phenomenon of Newton's rings was manifested.

(2) Jet may occur in other places in Ireland, but is certainly obtained from the Coal-measures of Ballycastle, Co. Antrim, its characters being apparently due to the influence of basaltic dykes on the coal seams which occur there. There is a sample of an early polished specimen from this locality in the Dublin Museum, and I have heard, locally, of ornaments having been formerly carved from this material.

(3) As is well known, pearls are produced in a species of freshwater mussel (*Unio*) in the rivers of Fermanagh, Tyrone, and Donegal. There are records of pearls of considerable value having been found in these rivers.

(4) The lake referred to is obviously Lough Neagh, on the shores of which partially silicified wood of Eocene age is found. This subject has recently been discussed by Mr. Wm. Swanston (*Irish Nat*, vol. ii., (1893) pp. 63 and 104). As is so often the case with myths, this one has derived new features with repetition. Bartholomew has, apparently, improved upon his predecessors.

(5) These statements are from Giraldus Cambrensis' *Topographia Hibernia*, and I am indebted to the Rev. D. Murphy, S.J., for the following rendering of the original passages :—

Cap. VI.—"There is an island situated on the western part of Connaught, named Aran, which St. Brendan blessed. Dead bodies are not buried there, nor do they grow corrupt; but placed in the open air, they remain incorruptible."

Cap. IV.—"There is a lake in North Munster, containing two islands, one larger and a smaller. The larger has a church of an old religious order; the smaller, a chapel which Culdees serve. In the smaller no one ever died or could die a natural death; hence it is called the island of the living. Sometimes the inhabitants are afflicted by mortal diseases, and much affected, even to the drawing of the last breath. And when there is no longer any hope, or vital power remaining, and they are so worn out by the strength of the illness that they had rather die than live, they have themselves taken in a boat to the larger island; and as soon as they touch land, they give up the ghost."

N.B.—The name of the island is Inis-na-mbeo, *i.e.*, island of the living; now Mona-hincha, *i.e.*, bog of the island. It is no longer an island, the waters that surrounded it having been drained off. It is about two miles S.E. of Roscrea, Co. Tipperary. There are remains of a very beautiful Irish church of the 8th or 9th century on the island.—D.M.

(6) These remarks about serpents and venomous beasts appear likewise to be derived from Giraldus, whose observations at large on such subjects are, perhaps, deserving of more special and direct criticism and investigation than they have hitherto received.

(7) I make no comment on this account of our ancestors and predecessors, though it affords a subject for reflection which would, however, scarcely be legitimate for treatment in this Journal.

THE PLANTS OF WESTMEATH.

BY H. C. LEVINGE, D.L.

THE following list of plants, from which all the commoner species have been excluded, fairly represents, I believe, the Flora of the central part of the Co. Westmeath in the neighbourhood of the larger lakes, Ennel, Derevaragh, and Owel; but though I think it unlikely the lists will ever be very largely added to, it can hardly be called a *complete* enumeration of the rarer plants of the county, as I regret I have not had many opportunities of examining the remaining portion of the county, but I believe the parts most likely to prove botanically interesting have been thoroughly explored. I have availed myself of the kind permission given to me by Mr. Barrington to quote largely from the interesting paper by himself and Mr. Vowell on the "Flora of the Shores of Lough Ree," and have included, in my list, the names of all the rarer plants which they observed in their explorations of that part of the country inside the boundaries of Westmeath. It must, however, be remembered that in their abstract of names of plants, new to district 7 of the "Cybele Hibernica," they have included those which occur in the Co. Longford as well as those of Westmeath. Mr. Barrington was kind enough to indicate, for my use, most of the Westmeath species; but there still remain a few, noted as common or frequent round the lake, regarding which some uncertainty exists, and in each doubtful case I have made a separate note. The rock in the tract immediately under notice is the Upper Carboniferous Limestone, and the three lakes above mentioned form the prominent feature of the country. Of these L. Ennel, supplied by the River Brosna—274 feet above the sea-level, and with an area of 3,603 acres—is the largest; next comes L. Derevaragh—sometimes called Donore Lake—210 feet above the sea, and having an area of 3,051 acres. At its S.E. end rise three considerable hills, Knock Body, Knock Ross, and Knock Eyon, the top of the last named being 707 feet above the sea. The River Inny, which flows through a series of large bogs from L. Sheelin, enters and leaves the lake at its N.W. end. Lastly L. Owel, 329 feet above the sea, and 2,527 acres in extent, forms the summit-level supply to the Royal Canal, which extends eastwards to Dublin and westwards to the

Shannon. The water of this lake is exceptionally clear and brilliant, and of a pale emerald-green colour in the shallows; but, being supplied almost altogether from springs, it is exceedingly hard, and the plants growing in it are consequently much encrusted. With these few preliminary remarks I now proceed to mention some of the most interesting plants found in and near these lakes, and in other selected localities. On the shores of L. Ennel, *Stellaria glauca*, *Cicuta virosa*, *Carex paradoxa*, and *Carex Œderi* were observed; and it was in this lake that *Chara tomentosa* was first discovered; it is, however, here somewhat dwarfed, and, as far as I have seen, does not appear to grow to anything like the same size as in the other lakes. In L. Derevaragh I was fortunate enough to find *Ceratophyllum demersum*, rather a scarce plant in Ireland, but abounding in that part of this lake known as the "Pond of Donore." Here also, plentifully distributed, grows the beautiful *Chara tomentosa*, with its pink, coral-like, branched heads, and in this part of the lake, as well as in the boat harbour of Kiltoom, *Tolypella glomerata* was found in abundance. Near the Coolure shore, at the mouth of the Yellow River, *Callitriche hamulata* and *C. obtusangula* were observed by Messrs. J. and H. Groves. L. Owel produces some uncommon plants, *Potamogeton prælongus*, *P. Zizii*, *P. lucens*, and *P. heterophyllus*, as well as a species, growing near Mount Murray, not fruiting or coming to the surface, which the Messrs. Groves were unable to determine; it resembles *P. nitens* in foliage and general character. In this lake are also *Ranunculus pseudo-fluitans*, *R. trichophyllus*, *Myriophyllum verticillatum*, *M. spicatum*, and *Chara tomentosa*, the latter growing in a bay, or rather an inner lake at Tullaghan, even finer and larger than in Lough Derevaragh. A variety of *C. tomentosa* was also discovered in a drain connected with the lake by the Messrs. Groves, who have not yet, I believe, given it a name. At the N.W. end, in the marshy, and at times submerged land near the village of Bunbrusna, *Lathyrus palustris* grows luxuriantly and plentifully along with *Scutellaria galericulata*, *Rumex Hydrolapathum*, and *Cnicus Forsteri*, and at the S.E. end of the lake, near the canal supply at Levington, *Juncus obtusiflorus* occurs. But nowhere in the county have so many rare plants been observed as in the 'Scraw bog' of Loughanstown and Ballynegall, situate about half a mile to

the east of L. Owel. This flow bog, which is three-quarters of a mile long, and about one furlong wide, owes its name to the 'scraw' or mat of vegetation which, as it were, floats on the water and mud beneath—and as there are many holes it is essentially a dangerous place, especially after heavy rains, when it is more or less submerged. The 'scraw' is formed mostly of *Carex teretiuscula* and *C. filiformis*, both rather uncommon elsewhere; other sedges are *C. dioica*, *C. pulicaris*, *C. limosa*, &c. *Vaccinium Oxycoccos* here forms large beds from which quantities of cranberries—or, as they are termed in Ireland, bogberries—are gathered, while some of the drains are at the proper time white with the delicate flowers of *Hydrocharis Morsus-ranæ*; but the most beautiful plant here is *Pyrola rotundifolia*, which grows in luxuriant profusion, generally through tufts of willows; *Juncus obtusiflorus* is also abundant, and my friend Mr. A. G. More will have to modify the remarks in "Cybele Hibernica" that the few Irish localities known are "on or near the sea coast." In one of the small holes in this bog Mr. H. Groves discovered, for the first time in Ireland, that beautifully delicate little plant *Nitella tenuissima*. I have searched diligently, but in vain, for this in other places; it has however been since found by Mr. Groves in a bog in the County Galway. In some of the holes *Potamogeton plantagineus* occurs, and a fine form of *Chara polyacantha*, also *Chara fragilis* var. *barbata*. In the list, frequent mention is made of Knock Ross; this hill, with its steep rocky slopes covered with brushwood, which I believe to be indigenous on its southern side at least, forms a promontory in the S.E. end of L. Derevaragh. Here occurs *Cornus sanguinea*, identical with the Clare plant; there seem to be some doubts whether it is truly indigenous in this locality; but if it be not so, it is at any rate thoroughly established and very plentiful. In the wood, near the shore of the lake, I observed two rather uncommon grasses, *Milium effusum* and *Festuca sylvatica*, also at the water's edge on the northern side *Crepis paludosa*, and two forms of *Festuca elatior*, var. *loliacea*, Huds., regarding which some remarks will be found in the list. In the Knock Ross woods I gathered most of the *Rubi* which are included in the list below; these have all been examined and named by the Rev. E. F. Linton. I have no doubt that many more species exist in this as well as in other localities in the county, and I

much regret that, owing to my imperfect knowledge of this difficult genus, I am unable to distinguish the several species and varieties as now arranged by experts. In the bog of Lisclogher, situated quite at the eastern side of the county, near the borders of Meath, and in the exploration of which I had the great advantage of Miss E. Reynell's assistance, the following plants occur:—*Saxifraga Hirculus* and *Pyrola rotundifolia*, both sparingly; *Empetrum nigrum*, *Viola palustris*, *Carex dioica*, *C. limosa*, *Drosera anglica*, and *Lastrea Thelypteris*.

The total number of species hitherto observed in the county is 560; and when it is considered that the list of *Rubi* is still incomplete, and that maritime plants are of necessity not represented, it will I believe be found that this number bears favourable comparison with that of other counties. In this list, 66 additions have been made to district 7 of the "Cybele Hibernica," inclusive of 15 *Rubi*.

In compiling the list it was my wish and intention to include the names of the rarer plants only; but as some of the more common ones had not been recorded in the "Cybele Hibernica" as from district 7, I have been obliged to notice them, otherwise they might very well have been left out.

To Mr. A. G. More my best thanks are due for the kind assistance he has always given me in determining doubtful species, and for his advice in arranging the materials for this paper; also to Messrs. Barrington and Vowell for permitting me to make use of their pamphlet on the "Flora of the Shores of L. Ree"; to Mr. E. F. Linton for examining and naming the *Rubi*; and to the Messrs. Groves, who identified the Characeæ and other aquatic plants.

In the list, the letters B. and V. represent Messrs. Barrington and Vowell; F. J. F. represents Mr. Foot; and D. M., Dr. David Moore.

The mark ! indicates plants which I have myself observed; but it has only been used in cases where others have also collected the species. The number "VII." occurring after the name of any plant signifies that it had not previously been recorded from that district as defined in the "Cybele Hibernica." The marks *, †, and ‡ signify respectively that the species so indicated have been certainly, probably, or possibly introduced.

(TO BE CONTINUED.)

ON A RECENT FIND OF IRISH ELK BONES, &c., IN BELFAST,

BY R. M. YOUNG, B.A., M.R.I.A.

(Read before the Belfast Natural History and Philosophical Society, 6th March, 1894.)

In connection with the great system of main drainage which is now approaching completion in Belfast, excavations for an intercepting sewer were made in January of this year under the footpaths on the east side of High Street and Castle Place. A quantity of human bones were dug up opposite St. George's Church, where the burying ground of the previous Church of St. Patrick had extended, but it was not till the workmen reached Castle Place that anything of special interest was found. On the 18th January an intelligent workman brought me three jaw-bones which had been taken from a depth of seven feet under the footpath at Mr. Watson's shop, No. 10, Castle Place. Prof. R. O. Cunningham, M.D., kindly examined these bones, and pronounced them to be those of an Irish Elk, Horse and Sheep. Opposite Messrs. Hart & Churchill's shop quite a number of jaws of the Irish Elk were turned up, with some fragments of leg and rib bones; these were associated with branches of trees, probably Willow, and were 6 feet 10 inches under the surface of the footpath flags. No other bones appeared till the excavation reached Bank Lane, where Mr. S. F. Milligan, M.R.I.A., secured some bones, apparently of the horse and dog, which he has kindly presented to the Museum.

As the fine specimen of the Great Irish Deer (*Cervus giganteus*) in the Belfast Museum is well known, I may merely mention that this splendid animal surpassed in size the largest living deer (*Cervus canadensis*). Its antlers were sometimes more than eleven feet from tip to tip, whilst those of the Moose are only four feet. The most recent local discovery of Irish Elk bones seems to be that described by Mr. R. Ll. Praeger on 16th February, 1892, when he exhibited at a Field Club meeting a skull found in the preceding December in excavating near the Spencer Basin. It was in the centre of a peat bed, three feet thick, with a depth of thirty feet of estuarine clay above. In the same bed of peat at the Alexandra Dock, bones of the Red Deer and Wild Boar are recorded by Mr. Praeger. This present find of Irish Elk bones seems

the first to be noted within the municipal boundary of the city. In 1860, when the sewer through which the Farset, or High Street river, flows was re-built in Castle Place, a large number of antiquities were dug up, but amongst them the only bones were a human skeleton and a boar's tusk.

There are some features of special interest to be noted with regard to this latest discovery of animal remains. They were lying almost on the surface of the estuarine clay or "sleech," and the Irish Elk, horse, and sheep bones were found close together as if either swept down by some flood or possibly deposited in situ by human agency. This latter supposition is strengthened by the remarkable appearance of some of the larger bones, which apparently have been broken into short lengths to extract the marrow. They resemble in this respect the bones so treated by the cave-men and the Swiss lake-dwellers. Prof. Cunningham has kindly promised to look carefully over these bones again, as he could only give them a hasty examination.

It is of importance to note that in 1868 a deposit of similar geological age was met with at the Clowney River, where the Broadway Factory now stands; and amongst the bones of the Red Deer dug up two were found with artificial markings where flint tools had been at work.

Another recently discovered relic of the past may be mentioned as occurring in the same stratum of the estuarine deposits about half a mile distant from Castle Place. I refer to the supposed canoe which was cut through in driving sheet piles at the Council waste ground near Albert Bridge, where Messrs. Workman & Co. have a section of the main sewer in construction. On visiting the place last December with Mr. L. M. Ewart, J.P., M.R.I.A., we saw at a depth of ten feet the trunk of an oak tree, four feet in diameter, which was excavated or burnt out on the upper side like a canoe. A piece was cut out of the centre by the piles, and measured 6½ feet long by 4 feet wide and 3 feet deep. The thickness of the side was not more than 6 inches, and the wood was sound in the middle. The two extremities of the tree were then undisturbed in the "sleech," but I understand that one end has now been laid bare, and it forks off into two branches. As the other end is still covered it might show visible signs of a canoe in process of manufacture, if exposed.

INSECTS COLLECTED BY THE ROYAL IRISH ACADEMY FLORA AND FAUNA COMMITTEE, 1893.

BY REV. W. F. JOHNSON, M.A., F.E.S., J. N. HALBERT, AND GEORGE H. CARPENTER, B.SC.

THE Committee appointed by the Royal Irish Academy to report upon the Irish Flora and Fauna directed insect collections to be made by us in four localities during 1893. We have now pleasure in making public the result of our work, which has been fruitful in adding many new species to our known fauna, and extending our knowledge of the range of many more. Yet, it is certain that much more remains to be done before our knowledge of any group of insects —even the best-worked—can be said to have approached completion. We therefore make no apology for giving complete lists of the insects collected, the range of the commonest species being worth knowing exactly; and we trust that our present contribution may supplement the classic researches of the pioneers of Irish entomology—Haliday, Hogan, and Birchall—in affording material for the perfect lists of the future, which we all hope to see.

A short description of the localities worked is desirable. Mr. Johnson collected at Coolmore, Co. Donegal, in July; Mr. Carpenter worked along the southern shores of Bantry Bay at the end of May and early days of June, and at Killarney at the end of November; Mr. Halbert explored the Dundalk district in July (on the occasion of the joint excursion of the Dublin and Belfast Field Clubs), and the Cavan district early in October. Regions in the north-west, south-west, north-east, and northern midlands of Ireland have thus been worked.

The north-western station, Coolmore, is situated on the southern side of Donegal Bay, about 4½ miles north-west of Ballyshannon. Northwards the coast is sandy, with extensive dunes, but southwards, towards the mouth of the River Erne, it is rocky. Inland, the surface is hilly with a few trees in the sheltered valleys. One day was spent on the River Erne above Ballyshannon, and another at Brown Hall, Ballintra; both were very promising localities, but unfortunately it was impossible to spend more than a few hours at each. At Coolmore

the sandy beach, dunes, and some marshy ground beyond them were most productive. Some good things were also got at Kilbrannan Castle on the cliff, and at Coolbeg on thistles, &c., and under the bark of dead trees.

In the south-western district Killarney is well enough known, and the insects obtained were but few and common; some rare spiders, however, rewarded the collector, but their records are reserved for a general list of Irish spiders now in course of preparation. At Bantry Bay, Castletown-Berehaven was the head-quarters, and in its neighbourhood the wild cliffs and the beautifully wooded demesne of Dunboy afforded excellent collecting-ground. Dr. M'Weeney and Mr. M'Ardle, when botanizing on Bere Island, were so good as to pick up what insects they saw. Dr. Scharff made some interesting discoveries during an ascent of the precipitous Hungry Hill, which rises to the east of Castletown to a height of over 2,000 feet; its slopes, now bare and rugged, are said to have nursed a rich growth of Arbutus in former days. Would that a collector had visited it then! To the north of Castletown is the lower range of the Slieve Mishkish, with wide-stretching tracts of bog. A day was spent on Dursey—the island to the extreme west of the peninsula. From Adrigole, a village to the east of Castletown, an excursion was made, first over large tracts of bog, and then by a rugged pass behind the Sugarloaf Mountain to Glengariff. A few insects were obtained in the woods at the latter place.

In the north-eastern district collections were made near Dundalk, on Slieve Gullion (1,893 ft.) and Fathom Hill, Co. Armagh, along the beach at Carlingford and Greenore, and in the grounds of Narrow Water, Co. Down.

In the neighbourhood of Cavan, the collecting extended from the 7th to the 11th of October; many of the localities worked proved very productive, the best probably being Lough Oughter shore, one of a chain of lakes occupying a considerable portion of the centre of the county, and lying to the west of the town; on its margin are remnants of very old woods, as well as Birch and Fir plantations; the lake itself looked barren and unproductive, partly due to the lateness of the season, the vegetation being practically over, but from the drains, and especially along the shore many interesting species were taken. The country about the town is of a very

undulating character, the principal elevation being Slieve Glah (1,057 feet), which was carefully searched for the mountain species, and the woods near Cultragh Lough, a large sheet of water to the north of Slieve Glah, also yielded good results. One day was spent at Ballyhaise, about four miles from Cavan, the extensive plantation on the south bank of the river Annalee, known as Oak Wood, being very productive. Those species in the list localized "Cavan" were obtained by sweeping, examining bark, moss, &c., in the narrow strips of planted wood bordering the roads, in many places, in the vicinity of the town; a short time was also spent in the Farnham demesne. Altogether, there are many promising localities, especially the lake shores, which would undoubtedly repay a more thorough investigation.

HEMIPTERA HETEROPTERA

In enumerating the insects of this group, we think it advisable to give, in addition to the localities mentioned above, any others in Ireland from which we know them to have been recorded or captured. So little is known of the distribution of these insects in Ireland[1] that it is advisable to give the range as fully as possible. An asterisk is prefixed to the species (four in number) which we believe to be new to the country. We have to thank Mr. E. Saunders, F.L.S., for identifying some of the species.

PENTATOMIDÆ.

Carpocoris baccarum, L.—Dursey. This local species has occurred also in the south-west near Dingle. Mr. J. M. Browne has taken it on Gt. Aran Island, Galway Bay, and also on Inishbofin, off Co. Mayo; Dr. Power near Waterford, Mr. H. G. Cuthbert at Courtown, Co. Wexford, and Mr. W. F. de V. Kane at Howth. In England it seems confined to the south, and is specially characteristic of the south-western counties.

Tropicoris rufipes, L.—Berehaven. Also occurs at Armagh (W.F.J.), Dublin (J.N.H.)

COREIDÆ.

***Syromastes marginatus,** L.—Berehaven. This insect is new to Ireland, and is also, we believe, the first example of its sub-family (*Coreinæ*) ever taken in the country. In Great Britain it seems confined to the south of England and South Wales, a distribution characteristic of the British insects of the family, not one of which, according to Mr. E. Saunders, has been found in Scotland. Mr. Haliday took *Corizus parumpunctatus*, Schill. (sub-fam. *Corizinæ*) in Ireland.[2]

---

[1] *See* E. Saunders,—The Hemiptera-Heteroptera of the British Isles, London, 1893. W. F. Johnson,—Hemiptera in the North of Ireland, *Ent. Mo. Mag.*, xxix., 1893, p. 35. Dr. Power,—*Entomologist*, xv., 1878.

[2] In Thompson's Nat. Hist. Ireland, vol. iv., p. 367, Haliday gives four as the number of species of *Coreidæ* in Ireland. From his MS. list (kindly lent us by Dr. E. P. Wright) it appears, however, that three of these are *Berytidæ*.

LYGÆIDÆ.

Nysius thymi, Wolff—Coolmore. Has also occurred at Bundoran (W.F.J.), and Dr. Power has taken it near Dublin.

Stygnus pedestris, Fall. — Coolmore. Ballyhaise. Armagh (W.F.J.), Dublin (J.N.H.)

S. arenarius, Hahn—Berehaven. Armagh (W.F.J.). Near Waterford (Dr. Power).

Drymus brunneus, Sahlb.—Killarney. Also at Powerscourt (Dr. R. F. Scharff).

Scolopostethus decoratus, Hahn—Slieve Glah, commonly on heath. Has also been recorded from Carlingford and Co. Armagh (W.F.J.)

TINGIDIDÆ.

Dictyonota crassicornis, Fall.—Coolmore. Taken by Mr. Haliday in Co. Dublin.

Monanthia cardui, L.—Coolmore. Also recorded from Armagh (W.F.J.); locally common in Co. Dublin (J.N.H.)

HYDROMETRIDÆ.

Hydrometra stagnorum, L.—Berehaven; Dursey. Also recorded from Armagh (W.F.J.); common in Co. Dublin (J.N.H.)

Velia currens, Fab.—Coolmore. Dundalk. Berehaven, common; Dursey. Common in Co. Armagh (W.F.J.) and Co. Dublin (J.N.H.), and doubtless generally distributed.

Gerris costæ, H.-S.—Slieve Gullion, in a small pool near the summit. This northern and alpine species has also occurred at Newtown Hamilton, Co. Armagh, and Ardara, Co. Donegal (W.F.J.)

G. thoracica, Schum.—Coolmore. Also at Tallaght, Co. Dublin (J.N.H.)

G. lacustris, L.—Coolmore. Berehaven; Dursey. Also recorded from Armagh (W F.J.), common in Co. Dublin (J.N.H.)

REDUVIIDÆ.

Nabis flavomarginatus, Scholtz—Dundalk; Carlingford. Also recorded from Armagh (W.F.J.), and Dublin (J.N.H.)

N. limbatus, Dahlb.—Dundalk, common. Also recorded from Co. Armagh (W.F.J.), Co. Dublin (J.N.H.)

SALDIDÆ.

Salda orthochila, Fieb.—Slieve Gullion, in moss near summit. Also recorded from Armagh (W.F.J.) and Dublin (J.N.H.)

CIMICIDÆ.

Anthocoris nemoralis, Fab.—Dundalk. Also taken at Ardara and Armagh (W.F.J.), and in Co. Dublin (J.N.H.)

A. sylvestris, L.—Dundalk. Cultragh Lough. Recorded from Armagh and Ardara (W.F.J.), common in Co. Dublin (J.N.H.)

CAPSIDÆ.

***Pithanus Maerkeli,** H.-S.—Dundalk. This insect, widely distributed in Great Britain, has not been recorded for Ireland before. Taken also in Co. Dublin (J.N.H.)

Miris calcaratus, Fall.—Dursey. Recorded from Armagh (W.F.J.) has also occurred in Co. Dublin (J.N.H.)

M. holsatus, Fab.—Coolmore. Recorded from Armagh (W.F.J.) common in Co. Dublin (J.N.H.)

Leptopterna ferrugata, Fall.—Fathom. Recorded from Armagh, Ardara, and Beleek (W.F.J.) and at Portmarnock (J.N.H.)

Monalocoris filicis, L.—Narrow-water. Cultragh Lough. Recorded from Bundoran (W.F.J.), Co. Dublin (J.N.H.)

Calocoris bipunctatus, Fab.—Coolmore. Dundalk, common. Recorded from Armagh, Bundoran, Ardara, and Beleek (W.F.J.), common in Co. Dublin (J.N.H.)

C. roseomaculatus, DeG.—Carlingford. Recorded from Armagh (W.F.J.)

Lygus pratensis, Fab.—Carlingford. Recorded from Armagh (W.F.J.), common in Co. Dublin (J.N.H.)

var. **campestris**, Fab.—Dundalk. Recorded from Ardara (W.F.J.), common in Co. Dublin (J.N.H.)

***L. viridis**, Fall.—Fathom. This species also taken in Co. Dublin (J.N.H.) is distributed over the south of England, seems not to have been previously recorded from Ireland.

***L. lucorum**, Mey.—Dundalk. New to Ireland Also taken in Co. Dublin (J.N.H.); recorded from England, Wales, and Scotland.

L. pabulinus, L.—Dundalk. Recorded from Armagh and Ardara (W.F.J.) Common near Dublin (J.N.H.)

L. cervinus, H.S.—Dundalk. Recorded from Co. Armagh (W.F.J.) Common in Co. Dublin (J.N.H.)

Rhopalotomus ater, L.—Coolmore. Dundalk. Recorded from Armagh and Beleek (W.F.J.) Common in Co. Dublin (J.N.H.)

Campyloneura virgula, H.S.—Narrow-water. Recorded from Co. Armagh (W.F.J.) Taken in Co. Dublin (J.N.H.)

Mecomma ambulans, Fall.—Carlingford; Fathom, common. Recorded from Armagh (W.F.J.) Common near Dublin (J.N.H.)

Plagiognathus arbustorum, Fab.—Coolmore. Dundalk, common. Recorded from Armagh, Bundoran, and Ardara (W.F.J.) Common in Co. Dublin (J.N.H.)

P. viridulus, Fall.—Coolmore. Carlingford, common. Recorded from Armagh and Greenore (W.F.J.) Common in Co. Dublin (J.N.H.)

NEPIDÆ.

Nepa cinerea, L.—Coolmore. Lough Oughter, under stones at some distance from the water's edge. Recorded from Armagh (W.F.J.) Common near Dublin (J.N.H.)

NOTONECTIDÆ.

Notonecta glauca, L.—Coolmore. Slieve Gullion, lake at summit. Lough Oughter. Doubtless generally distributed, as it has also been taken at Armagh (W.F.J.) and Dublin (J.N.H.)

var. **maculata**, Fab.—Lough Oughter. Clonmacate (W.F.J.)

CORIXIDÆ.

Corixa Geoffroyi, Leach.—Coolmore. Recorded from Armagh and Ardara (W.F.J.)

C. atomaria, Illig.—Coolmore. Also recorded from Holywood, Co. Down (W.F.J.)

C. striata, Fieb.—Coolmore. Recorded from Armagh and Holywood (W.F.J.)

C. Fabricii, Fieb.—Coolmore. Recorded from Armagh, Holywood, and Ardara (W.F.J.)

Sigara minutissima, L.—Coolmore. Only hitherto known as Irish from specimens in the collection of the late A. H. Haliday.

HEMIPTERA HOMOPTERA.

This group has been even less worked in Ireland than the Heteroptera, we therefore give all the localities known to us for the species taken. An asterisk is prefixed to those for which we can find no previous Irish record. Our best thanks are due to Mr. J. Edwards, F.E.S., to whom most of the specimens have been submitted.

FULGORIDÆ.

Cixius nervosus, L.—Coolmore. Carlingford. Slieve Gullion. Also recorded from Armagh (W.F.J.) Taken at Drogheda (G.H.C.)

C. cunicularis, L.—Fathom. Also recorded from Armagh and Ardara (W.F.J.)

C. pilosus, Ol.—Slieve Gullion. Also recorded from Armagh W.F.J.)

CERCOPIDÆ.

Aphrophora alni, Fall.—Coolmore. Also recorded from Maghery, Co. Armagh; Bundoran and Ardara, Co. Donegal (W.F.J.) Common near Dublin (J.N.H.) Taken at Londonderry (Mr. D. C. Campbell).

Philænus spumarius, L.—Coolmore. Dundalk. Recorded from Armagh, Bundoran, and Ardara (W.F.J.) Common in Co. Dublin (J.N.H.)

P. lineatus, L.—Carlingford. Recorded from Ardara (W.F.J.) Common in Co. Dublin (J.N.H.)

IASSIDÆ.

Ulopa reticulata, Fieb.—Slieve Gullion. Recorded from Churchill and Newtown-Hamilton, Co. Armagh, and Ardara. Also taken on Bray Head (J.N.H.)

* **Macropsis lanio**, L.—Fathom. Not previously recorded from Ireland, but was in the collection of the late A. H. Haliday.

Evacanthus interruptus, L.—Coolmore. Carlingford. Also recorded from Armagh and Ardara (W.F.J.) Common in Co. Dublin (J.N.H.)

* **E. acuminatus**, Fab.—Fathom. Not previously recorded from Ireland.

Tettigonia viridis, L.—Coolmore. Dundalk. Aso recorded from Armagh (W.F.J.) Common in Co. Dublin (J.N.H.)

Acocephalus nervosus, Schr.—Carlingford. Also taken near Dublin (J.N.H.) Co. Antrim (Rev. A. Brenan).[1]

* **A. albifrons**, L.—Coolmore. Has been taken in Co. Dublin (J.N.H.) Not previously recorded from Ireland, but was in the Haliday collection.

* **Athysanus obsoletus**, Kbm.—Dundalk. Slieve Gullion. Not previously recorded from Ireland.

PSYLLIDÆ.

* **Psylla costalis**, Flor.—Coolmore. Not previously recorded from Ireland.

* **P. peregrina**, Forst.—Coolmore. Not previously recorded from Ireland.

* **P. Forsteri**, Flor.—Coolmore. Has been taken near Dublin (J.N.H.) Not previously recorded from Ireland.

---

[1] G. B. Buckton—Monograph of the British Cicadæ. London, 1890.

COCCIDÆ.

Orthezia cataphracta, Shaw—Slieve Glah. Two females in moss at the foot of the mountain. Occurs also at Armagh (W.F.J.) We are glad to record new Irish localities for this interesting insect which Mr. H. C. Hart[1] found in Cos. Wicklow and Donegal. It is a northern species, occurring in Scotland, Northern England, Lapland, and Greenland, and has been found also in the alps of Styria, by Herr J. H. List.[2]

PROCEEDINGS OF IRISH SOCIETIES.

Royal Zoological Society.

Recent donations comprise a Wild Turkey from Dr. C. B. Ball, and a Barn Owl and a Sparrow-hawk from E. Popham, Esq. An Indian Antelope has been purchased, and a Pigmy Calf has been born in the Gardens.

4,500 persons visited the Gardens in February.

Dublin Microscopical Club.

February 15th.—The Club met at Mr. A. Andrews'.

Mr Greenwood Pim showed chlamydospores of a *Hypomyces*, probably *H. cervinus*, Tul., which occurred on *Helvella* gathered at Killakee last September. All the species of *Hypomyces* are parasitic on other fungi, usually Hymenomycetes. *H. cervinus* is the only one described in Plowright's monograph (*Grevillea*, Vol. XI.) as occurring on Ascomycetes (*Peziza morchella*). The specimen showed accorded very nearly with the figure in *Grevillea*, Tab. 155, f. 2, as well as agreeing in the matter of host plant.

Mr Moore showed specimens of *Cribraria aurantiaca*, Fr. They were found growing on some peat which had been imported from Hampshire, which was placed in a very hot, moist atmosphere. The fungus first made its appearance on pieces of the dead stems of *Pteris aquilina*, which were in the peat, and then rapidly spread over the whole surface of the pot of peat, six inches in diameter.

Dr. Scott showed preparations and a pure culture of a micrococcus which occurred as an air contamination on a plate-culture in the laboratory of the Royal College of Surgeons. The naked-eye characters of the growth in the early stage were very similar to *Saccharomyces rosaceus*, but later on get a more waxy appearance, and a darker colour. The organism does not liquify gelatin, but grows slowly on the surface, at first pink, later of the colour known to artists as "light red." On agar-agar it forms a pure salmon-colour; on potato it is reddish. It is non-motile; in diameter about 0·001 m.m. These characters agree very closely with *Micrococcus carneus*, described by Zimmermann as occurring in the Chemnitz water supply.

Prof. G. Cole showed a large section of dolerite into which fine veins from eurite have been injected, from a composite dyke south of Bloody Bridge, coast of Mourne. The eurite veins run out from a dyke 7 feet wide, which has intruded into a very wide dyke of dolerite. A delicate interpenetration has occurred along the south plane of junction, and some of the minute veins contain products of fusion from the dolerite. The latter rock has been locally remelted by the invading mass, and both the veins from the eurite and the adjoining basic lava show traces of a vitreous condition, the veins being composed of spherulitic rhyolite.

[1] *Entomologist*, vol. xiii., 1880, p. 284, 304; See also J. W. Douglas, in *Ent. Mo. Mag.*, vol. xvii., 1880-1, p. 172, 203; and *Trans. Ent. Soc.*, 1881, p. 297.

[2] *Ent. Mo. Mag.*, vol. xxii, 1885-6, p. 240.

Mr. G. H. Carpenter showed a male specimen of the strepsipterous insect *Elenchus tenuicornis*, Kirb., which had been taken many years ago near Belfast by the late A. H. Haliday. This very rare species, which has only occurred elsewhere in Britain at a few localities in the south of England, was long believed to be parasitic on bees, like *Stylops*, but Mr. E. Saunders recently (*Ent. Mo. Mag.*, 1892) obtained in Surrey a male in the act of emerging from a larval homopteron of the genus *Liburnia*. The female of *Elenchus* is still unknown. The *Stylopidæ* are considered by some authorities to form a special order of insects (Strepsiptera), but they are now generally believed to be abnormal coleoptera, related to the *Meloidæ* and *Rhipiphoridae*, which they resemble in their transformations —the larva being at first active and campodiform, afterwards legless and parasitic.

Mr. H. H. Dixon showed a transverse section of a leaf of *Dendobrium teretifolium* showing a peculiar passage, which runs down the axis of the cylindrical leaf. This passage when traced upwards is in communication with the exterior by a very minute opening placed laterally to, but very close to, the apex of the leaf. At the base the passage opens out into a funnel-shaped chamber which encloses the apex of the stem which bears the leaf, but which does not usually develop. The passage probably represents the upper surface which has become enclosed; it is lined by cells, closely resembling those of the outer epidermis, but considerably smaller. These lining cells are covered by a thick cuticle; however no stomata were found opening from the passage into the tissue of the leaf.

Mr. A. F. Dixon exhibited a human embryo of about 25-27 days, according to the method of dating embryos adopted by Prof. His. The embryo appeared to be normally developed, showing the different organs to possess relatively the proper sizes. It measured about 5 m.m. in its longest diameter.

Mr. M'Ardle exhibited a specimen of *Jungermania cuneifolia*, Hook., which he recently collected at O'Sullivan's Cascade, Killarney. This curious liverwort appears to be confined to the Co. Kerry; it has never been found in fruit. Sir William Hooker, who figured the plant in his grand work on the British Jungermania, tab. 65, writes—"The fructification is not at all necessary for its identification, the leaves and stipules affording abundant characters by which it may be known from every other in the genus." The late Dr. Spruce in his exhaustive work on the Hepaticæ of the Amazon and Andes considers it belongs to his new genus, *Clasmatocolea*; the only known species is figured at tab. xx., and it certainly resembles very much the Irish plant. At p. 440 he states—"These curious little plants come very near *Lophocolea*, but are well distinguished by the peculiar habit; the assurgent leaves, with a plane antical margin—not convexo-deflexed, with the antical margin decurrent, and recurved at the base (as in *Lophocolea*); the biform underleaves, mostly entire, but some bifid. The perianth, turgid and indistinctly carinate, is so fragile that the slightest touch breaks off the short unequal lobes at the wide mouth. I cannot doubt that the Irish *Jung. cuneifolia*, Hook., hitherto known only from sterile specimens, is a true *Clasmatocolea*. Specimens gathered a few years ago on Mount Brandon by M'Ardle are so like the arcuate barren shoots of *Cl. fragillima* that until I compared them closely I thought them the same species. The Irish plant (like the Andine) has both entire and bifid underleaves, and was correctly so described by Nees from original specimens of Miss Hutchins." Mr. M'Ardle also exhibited drawings showing the arcuate and divaricately branched stems, decurrent leaves and biform stipules.

Belfast Natural History and Philosophical Society.

March 6.—The President (Prof. Fitzgerald) in the chair. Mr. R. Patterson read a paper on "The Occurrence of the Marten (*Martes*

sylvatica) in Ulster." Mr. R. M. YOUNG, B.A., read notes on "A recent Find of Irish Elk Bones, &c., in Belfast." The latter paper appears in our present issue, and the former one we will publish shortly. Mr. S. F. MILLIGAN, M.R.I.A., read a paper entitled "Social Pictures of Ancient Ireland."

BELFAST NATURALISTS' FIELD CLUB.

FEBRUARY 20th.—The President in the chair. Mr. JOHN CARDWELL read a paper on the ancient church of Lisnagarric, Co. Down. Messrs. W. GRAY, F. W. LOCKWOOD, and F. J. BIGGER (Secretary) criticised the paper.

Mr. R. LLOYD PRAEGER, in a short lecture, contrasted the flora of County Dublin with that of Counties Antrim and Down. He pointed out the differences in the geological and physical features of the two areas, and the extent to which these affect the floras; and stated that the Dublin flora differed from that of the Belfast district chiefly in containing many limestone-loving species, and others that affect light and gravelly ground. A representative collection of characteristic Dublin plants was exhibited. A discussion ensued, in which Rev. C. H. WADDELL, Prof. COLE, F.G.S., and Messrs. W. GRAY, S. A. STEWART, and F. W. LOCKWOOD took part.

A paper on Localities for Lepidoptera near Belfast, by Mr. C. W. WATTS, was read on his behalf by Mr. Praeger. The Secretary subsequently read, for Lt.-Colonel PARTRIDGE, a paper on the Lepidoptera of Enniskillen. The election of a number of new members brought the meeting to a close.

DUBLIN NATURALISTS' FIELD CLUB.

MARCH 13th.—The President (Mr. G. H. CARPENTER) in the chair. Prof. W. J. SOLLAS, F.R.S., gave a lecture upon Ancient and Modern Coral Reefs. After referring to the fact that the Carboniferous Limestone, which forms so large a part of the surface of Ireland, is composed of coral remains, Prof. Sollas gave an account of the various kinds of corals now to be found living in the Great Barrier Reef of Australia. The lecture was illustrated by photographs from Mr. Saville Kent's recent work. Profs. JOHNSON and COLE, Mr. DUERDEN, and the President took part in the discussion. Prof. SOLLAS, in replying, mentioned that an expedition is to be organised to investigate the formation of reefs, by means of deep boring.

NOTES.

Phenological Observations.—I am very anxious to obtain for the Royal Meteorological Society a few more phenological observers in Ireland, and more especially in the southern half of the Island. The duties of an observer are extremely simple, and consist in accurately noting each year the dates of first flowering of such well-known plants as the Hazel, Coltsfoot, Wood Anemone, Blackthorn, Hawthorn, &c., only thirteen plants in all. Observers are also required to note down the dates of arrival of the Swallow, Cuckoo and Nightingale among birds, the first appearance of the Honey Bee, Wasps, and Small White Butterfly among insects. To any who may be willing to send in observations, I shall be happy to forward a specimen-observing form and complete instructions.—EDWARD MAWLEY, Phenological Recorder, R. Met. Soc., Rosebank, Berkhampstead, Herts.

[We gladly publish Mr. Mawley's communication and hope his appeal will meet with several responses from our readers.—Eds.]

BOTANY.

PHANEROGAMS.

Artemisia Stelleriana.—The *Journal of Botany* for March contains an interesting and well-reasoned article by F. W. C. Areschoug on the distribution of this plant; the writer considers the plant to be probably native in Europe, and makes out a good case in support of his contention. This species is found in Scandinavia, Kamstchatka, and North America, in maritime situations where it could not easily have arrived by artificial means. Last season our correspondent, Mr. C. B. Moffat, discovered it growing on the North Bull in Dublin Bay, which is its first known station in Britain.

Irish Brambles.—In the *Journal of Botany* for March, Mr. Praeger publishes a list of *Rubi*, collected by him last season in the Counties of Dublin, Meath, Wicklow, Kildare, Queen's County, and King's County. This difficult genus has been so little studied by Irish botanists that the present paper extends the range of all the twenty-four brambles enumerated. Two of them, *R. fuscus* and *R. echinatus*, are additions to the Irish list, and the notes on the remainder furnish a large number of new district records.

ZOOLOGY.

INSECTS.

Irish Butterflies—Lycæna artaxerxes in Co. Galway.—The list of Irish butterflies in our last month's issue has already received an addition. In the *Entomologist* for March, Mr. R. E. Dillon records the capture of *Lycæna astrarche*, var. *artaxerxes*, Fab., at Clonbrock, in July, 1893, in a list of lepidoptera from that locality. The discovery of this North British form in western Ireland is of great interest. We learn from Mr. W. F. de V. Kane that the record of *Argynnis adippe* from Galway, by Mr. Harker, was erroneous, and that Mr. Dillon's record is therefore the only Irish one for this species.

BIRDS.

Waxwing in Co. Down.—On February 23rd I examined in the flesh a Waxwing (*Ampelis garrulus*), received from Portaferry, Co. Down. It is a male, immature, with seven "wax" points on each wing, and measures eight inches from point of bill to end of tail. It was picked up dead in a potato shed, and was much emaciated, weighing only $1\frac{1}{4}$ oz. Mr. Sheals, who kindly drew my attention to this rare visitor, remarks that the only other Waxwing he has passed through his hands was received on the same day last year—23rd February, 1893.—ROBERT PATTERSON, Malone Park, Belfast.

Snow Buntings in Kildare.—In the *Zoologist* for March Mr. A. W. Hasted writes that during the winters of 1891-92 and 1892-93 a great number of Snow Buntings (*Plectrophanes nivalis*) visited the Curragh of Kildare. They apparently have a very local distribution there, as none were seen in any portion of the country surrounding the Curragh, though they were abundant on the open downs of the Curragh itself.

MAMMALS.

The Marten in Ireland.—The *Zoologist* for March contains a valuable statistical article by the Editor (Mr. J. E. Harting, F.L.S.) on the distribution of the Marten (*Martes sylvatica*) in Ireland, in which all authentic records known to the writer are enumerated under counties. We trust that the appearance of this paper will lead our Irish naturalists to contribute what notes they have on the subject. We are aware that some of them possess information that will considerably supplement the records given in the present paper.

CROSS DYKE, MACEDON POINT, WHITEHOUSE (Fig. 1)

NORTH STAR DYKE, BALLYCASTLE (Fig. 2).

From Photographs by Mary K. Andrews.]

The Irish Naturalist.

Vol. III. MAY, 1894. No. 5.

DYKES IN ANTRIM AND DOWN.

BY MARY K. ANDREWS.

THE study of every portion of the earth's crust is instructive, but the margin of our coast-lines is specially invested with the most varied and peculiar interest. Here we seem to gain a fuller insight into the architecture, so to speak, of the earth; the sea, aided by the various sub-aerial denuding agents, rain, frost, wind, &c., constantly wearing down and wearing back the coast-lines, as constantly bringing fresh surfaces to light. Independently of this ceaseless change, there is another reason why this belt of the lithosphere should claim our attention and excite our interest. It is here that we find some of the grandest displays of volcanic action. If we take the borders of the Pacific on the one side, from Cape Horn to the Aleutian Islands, on the other from Kamtschatka to Victoria Land, we find it encircled by volcanic cones, the greatest energy, at the present day, centring around the Sunda Strait. The detonations of Krakatoa in August, 1883, are still fresh in our memories.

Traversing the Atlantic Ocean from Greenland to Tristan d'Acunha, we have a more interrupted series of volcanic mountains; many are apparently extinct, but we find active vents in Iceland, in the Azores, in the Canaries and in other islands. In this sinuous band, the volcanic rocks of the North-East of Ireland may be included; its sheets of basalt and characteristic dykes remain witnesses to the igneous energy of the Tertiary Period.

Fringing this basaltic plateau, we have very interesting groups of dykes, a few, such as those at the Cave Hill, being exposed at considerable elevations. Several series are well seen on either side of Belfast Lough at low water. Those between Lower Whitehouse and Whiteabbey are particularly

striking: traversing the Triassic strata of the district in a general north-westerly direction, they appear as low wavy walls of dark rock, very slightly raised above the surrounding reefs. Macedon Point appears to have been in proximity to a special centre of disturbance, for here we find two dykes intersecting, thus forming a beautiful example of a cross dyke (fig. 1).

Immediately opposite, in Cultra Bay, we find dykes striking out to sea, in similar wavy lines, and traversing strata of very varied geological age.

Carrickfergus Castle stands upon one of the largest dykes of the district; the basalt of which it is composed is more coarsely crystalline than the basalt at Macedon Point, and is well exposed to view below and between the castle walls. This dyke forms a landmark of both geological and historic interest; it shows how the original line of weakness in the earth's crust, now strengthened by the filling in of consolidated lava, has offered more resistance to erosion, than the surrounding strata; and how man, seizing upon the position thus prepared by nature, has raised his structure on the point of strength due to the igneous action of bygone ages.

The basaltic dykes of our northern coast do not always strike out to sea in irregular branching lines; they sometimes rather present the appearance of artificial masonry composed of roughly rhomboidal blocks of basalt, such as "North Star" dyke (fig. 2). This remarkable dyke traverses the Carboniferous beds at Colliery Bay, and is known in the neighbourhood as the "Black Ditch."[1] It forms one of a series of interesting dykes close to Ballycastle, which attracted the attention of Dr. Hamilton, more than one hundred years ago; in 1784 he describes them "as extraordinary partitions of basaltes, which like walls of iron intersect the strata attendant on the coal of that place, and divide in twain the solid precipice from its summit to the base." Thirty years later Dr. Berger read an interesting paper "On the Dykes of

[1] "Ditch" is sometimes understood in Ireland as equivalent to "fence" or "bank." This recals the old term "whyn-dykes," which Dr. Richardson tells us "obtained in Scotland the name of *dykes* from serving often as fences, and from their material, that of *whyn*, the Gaelic name for basalt." Appendix to Dubourdieu's Statistical Survey of the County of Antrim, p. 68.

the North of Ireland" before the Geological Society. Although he found dykes at various altitudes, more than half of those he observed were situated on the sea-shore. From a careful determination of their compass bearings, he found their general uniform direction to be from south-east to north-west.

In the County of Down, we have a very interesting outlier of the Basaltic Plateau of Antrim, Scrabo Hill, which may possibly have been connected in the Tertiary Period with the lava-sheets north of Belfast Lough. It contains very striking examples of dykes, laid open in the faces of its various quarries. The dolerite of Scrabo not only overlies the Triassic sandstone of the hill, but has intruded along lines of weakness, in great horizontal sheets, the edges of which appear in the exposed sections as horizontal wavy dykes. In one quarry, the whole strata are traversed by a great vertical dyke, which not only cuts through the horizontal intrusive sheets, and intervening beds of sandstone, but pierces the capping of dolerite above. This vertical dyke stands out as a great leaning pillar against the hill; it is of looser texture than the intrusive sheets, and shows a tendency to spheroidal weathering.

In the present paper, I have only dwelt on a few out of the many characteristic dykes of our district; examples could easily be multiplied, and their study offers an interesting field of research.

Some geologists refer the basalt sheets of our plateau to "fissure" eruptions, others refer them to eruptions from volcanic cones, long since obliterated by glacial action. .It is not easy to obtain direct proof where so many of the original fissures must be concealed by the superincumbent masses. The thought indeed sometimes forces itself, may not the one form of eruption merge into the other, without any special surface of demarcation? To trace, where it is possible, the connection between the dykes, and the supposed old volcanic "necks" of the district might lead to interesting results.

To these sheets of basalt we owe the preservation of much of our land-surfaces; they have suffered denudation through the ages, but the denudation would have been much greater, had the softer strata been exposed to it unprotected.

It is in the balancing between the external and internal energies of the globe, that we find the conditions necessary

to the preservation of life upon the earth, and nowhere can the varied phenomena peculiar to each be studied with greater advantage, than in the numerous dykes that have added so much to the strength and beauty of our Northern Coast.

THE PLANTS OF WESTMEATH.

BY H. C. LEVINGE, D.L.

(*Continued from page* 80.)

LIST OF SPECIES.

Thalictrum minus, L.—Shores of Hare Island in L. Ree, B. & V., and shores of L. Ree, J.F.

T. flavum, L.—Ladestown, near L. Ennel! Dysart, near Delvin, Miss E. Reynell.

Ranunculus pseudo-fluitans, Bab.—L. Owel, near Portloman; not previously recorded from Co. Westmeath.

R. trichophyllus, Chaix.—L. Owel, with the last, near Portloman! and in a drain near Ballykeenan, L. Ree, B. & V.

R. Drouetii, Godr.—(VII.) River Gaine, Knock Drin.
var. **Godronii**, Gren.—(VII.) Road ditch, Quarry Bog, Knock Drin.

R. sceleratus, L.—Scraw Bog, Loughanstown! near Athlone, B. & V.

R. Lingua, L.—N.W. end of L. Owel! and in "suitable places" all round L. Ree, B. & V. But otherwise not previously recorded from the Co. Westmeath.

R. auricomus, L.—In woods at roadside near Belvedere.

‡ **Aquilegia vulgaris**, L.—Near Killynon, Miss E. Reynell! and near Coosan Point, L. Ree, B. & V.

Papaver Argemone, L.—Sparingly on the sides of L. Ree, B. & V.

P. dubium, L.—Knock Drin and Drinmore! not previously recorded from the Co. Westmeath.

Fumaria confusa, Jord.—(VII.) Knock Drin.

* **Cheiranthus Cheiri,** L.—Old toll gate at Athlone, B. & V.

Nasturtium palustre, DC.—Shores of L. Ennel.

N. amphibium, R. Br.—Frequent in drains all round L. Ree, B. & V.

Cardamine flexuosa, With.—(VII.) Knock Drin, frequent in the woods.

Sisymbrium officinale, Scop.—Near Mullingar and elsewhere! but not previously definitely mentioned from Westmeath, though said to be common near L. Ree, B. and V.

S. Alliaria, Scop.—Knock Drin, and on the stony shores of Lough Derevaragh at Knock Ross.

***Erysimum cheiranthoides,** L.—Knock Drin, not previously recorded from the county.

† **Senebiera Coronopus,** Poir.—Roadside near Athlone, B. & V.

Raphanus Raphanistrum, L.—Drinmore, Knock Drin! and near Ladywell, B. & V.

Viola palustris, L.—Lisclogher Bog, near Bracklyn.

† **V. odorata**, L., var. **alba**, Besser.—(VII.) Wood near the old mill. Knock Drin, well established.

V. tricolor, L.—Lisclogher Bog road, Miss Levinge; not previously recorded from the county.

Polygala serpyllacea, Weihe.—(VII.) Bog banks, N.W. end of L. Derevaragh.

Lychnis diurna, Sibth.—Knock Drin woods, plentiful.

Cerastium glomeratum, Thuill.—Knock Drin, abundant; not previously definitely recorded from this county, but common near L. Ree, B. & V.

C. triviale, Link.—Knock Drin, abundant, not previously recorded from the Co. Westmeath.

Stellaria glauca, With.—N.W. end of L. Owel! shores of L. Ennel, near the mouth of the Brosna! also near L. Ree, B. and V.

Arenaria trinervis, L.—Kilmaglish and Knock Drin.

A. serpyllifolia, L.—Top of Knock Eyon! and Coosan Point, L. Ree, B. and V.

Hypericum androsœmum, L.—On banks, Knock Drin, &c., frequent.

† **Malva moschata**, L.—Knock Drin, only once found.

† **M. sylvestris**, L.—Near the Crooked-wood.

† **Geranium pyrenaicum,** L.—Roadside between Mount Murray and Baronstown, Miss Levinge.

G. lucidum, L.—Roadside near Lynbury, and at Reynella.

G. Robertianum, L.—Near Donore, with white flowers; the type with pink flowers is the exception in that neighbourhood.

Rhamnus catharticus, L.—Knock Eyon, rare.

Medicago lupulina, L.—Knock Drin; not previously definitely recorded from the county, but said to be common near L. Ree, B. and V.

Ononis arvensis, Auct.—Only once seen in a field near Ladywell, B. and V.

* **Trifolium hybridum**, L.—(VII.) Knock Drin and Crooked-wood, in cultivated fields.

Lotus major, Scop.—(VII.) Knock Drin, not unfrequent.

† **Vicia hirsuta**, Koch.—(VII.) Knock Drin, rare.

‡ **V. tetrasperma**, Mœnch.—Knock Drin, rare.

V. sepium, L.—Knock Drin, not common.

Lathyrus palustris, L.—N.W. end of L. Owel, very luxuriant! and Temple Island, L. Ree, B. and V.

† **Prunus avium**, L.—Old wood, Knock Drin.

† **P. Padus**, L.—(VII.) Knock Drin woods.

Rubus Idœus, L.—Plentiful at Knock Drin and elsewhere.

R. fissus, Lindl.—(VII.) Drinmore, in boggy soil.

R. suberectus, Anders.—(VII.) Quarry Bog, Knock Drin.

R. umbrosus, Auct. Angl.—(VII.) Shefin Hill, Miss Levinge.

R. Lindleianus, Lees.—(VII.) Knock Ross

R. rusticanus, Merc.[1]—(VII.) Hedges about Knock Drin, common.

R. macrophyllus, W. and N.
var. **Schlechtendalii**, W. and N.—(VII.) Knock Ross.
var. **amplificatus**, Lees.—(VII.) Knock Ross.

R. pyramidalis, Kalt.—(VII.) Knock Ross. Mr. E. F. Linton remarks on this "rather more hairy, and rather less glandular than usual."

R. Drejeri, G. Jansen.—(VII.) Knock Drin.

R. fuscus, W. and N.—(VII.) Knock Drin and Knock Ross, frequent.

R. dumetorum, W. and N., var. **ferox**, Weihe.—(VII.) Knock Drin.

R. corylifolius x. cœsius.—(VII.) Knock Ross.

R. cœsius, L.—(VII.) Knock Ross, on stony shore of Derevaragh.
var. **ligerinus**, Genev.—(VII.) Deer Park fence, Knock Drin.
var. **intermedius**, Bab.—(VII.) Roadside hedge, Garraree, near Knock Drin.

R. saxatilis, L.—Knock Ross, abundant.

Geum rivale, L.—(VII.) Balrath, near Reynella, Miss E. Reynell!

Agrimonia Eupatoria, L.—Roadside between Mullingar and Sonna! and at Knock Drin, Miss Levinge, not common.

Poterium Sanguisorba, L.—Shore of Rinardo Bay, L. Ree, B. and V.

Rosa spinosissima, L.—Hare Island, L. Ree, Miss Levinge; not previously definitely recorded from this county, but reported as common near L. Ree, B. and V.

R. tomentosa, Sm.—Knock Drin; not previously definitely recorded from Westmeath; but said to be common near L. Ree, B. and V.

‡ **R. rubiginosa**, L.—(VII.) Hedges in Loughanstown, Mr. Groves.

R. arvensis, Huds.—Roadside between Killynon and Reynella, Miss E. Reynell! not previously recorded from the county; but referred to District 7 by B. and V. St. John's Wood (the locality given) is, however, in District 9, Co. Roscommon.

† **Pyrus Aria**, Sm.—Knock Drin woods; not previously definitely reported from this county, but said to have been found in most of the islands in L. Ree, B. & V.

Saxifraga Hirculus, L.—Lisclogher Bog; I gathered a few specimens of this rare plant in August, 1888, in the same place where it had been formerly found by Mr. Reynell, *vide* "Cyb. Hib.," p. 117.

S. tridactylites, L.—Hare Island, L. Ree, Miss Levinge; not common in the county.

S. hypnoides, L.—Recorded as from a rock at Reynella; but it is not there now.

Parnassia palustris, L.—Shores of L. Derevaragh, Drinmore, and Knock Drin.

Cotyledon Umbilicus, L.—On ruins of Mortimer's Castle, near L. Derevaragh; rare.

Drosera anglica, Huds.—Lisclogher Bog.

Myriophyllum verticillatum, L.—(VII.) N. W. end of L. Owel, and a curious dwarf form near L. Ennel in 1893, growing on ground dry in the summer of that year, but usually submerged.
var. **pectinatum**, DC.—Bog holes in bog of Lynn.

M. spicatum, L.—L. Owel and River Gaine at Kilmaglish; not common.

M. alterniflorum, DC.—Brittas Lake and holes in Quarry Bog; not previously definitely recorded from this county, but referred to Dist. 7 by B. & V.; Kiltoom, the locality given, is in Roscommon, Dist. 9.

[1] *R. rusticanus* has been already recorded from District 7 in *Journal of Botany* for March, 1894 (p. 76).—Eds.

Epilobium palustre, L.—(VII.) Kilmaglish, also edge of L. Ennel.

Callitriche hamulata, Kuetz.—(VII.) L. Derevaragh, J. and H. Groves.

C. obtusangula, LeGall.—(VII.) L. Derevaragh, J. and H. Groves.

‡ **Smyrnium olusatrum,** L.—Donore, near the lake at the Boat Quay.

Conium maculatum, L.—Knock Drin; not previously recorded from the county.

Cicuta virosa, L.—Edge of L. Ennel, near the mouth of the River Brosna; this plant is said to be fatal to cattle, but it is regularly grazed down in this locality, and the owner of the farm assured me that no harm to his animals ensues.

* **Carum Petroselinum,** Benth.—(VII.) Established on an old wall at Knock Drin.

Sium latifolium, L.—Near Mullingar, J. F., and in many places along L. Ree, B. and V. I have not seen this in the county.

S. erectum, Huds.—Drains at Knock Drin.

‡ **Ægopodium podagraria,** L.—Killynon, Donore, &c.

Conopodium denudatum, Koch.—Knock Drin and Donore woods, plentiful; not previously definitely recorded from Westmeath, but said to be frequent along L. Ree, B. and V.

* **Myrrhis odorata,** Scop. — Crossadree Churchyard, Miss E. Reynell!

Anthriscus vulgaris, Pers.—In Westmeath, F. J. Foot. I have not seen this in the county.

Œnanthe fistulosa, L.—Edge of L. Ennel! By the River Inny, B. and V.

Œ. phellandrium, Lam.—Growing to ten and twelve feet in length in deep water at Knock Ross and Knock Eyon in L. Derevaragh; not previously definitely reported from this county, but said to be common along L. Ree, B. and V.

† **Æthusa Cynapium,** L.—Knock Drin, not previously recorded from this county.

Daucus Carota, L.—Kilmaglish; not previously definitely recorded from this county, but it is common along the shores of L. Ree, B. and V.

Cornus sanguinea, L.—(VII.) Knock Ross, well established if it is not indigenous.

Galium boreale, L.—Shores of L. Ree, F. J. Foot and B. and V. I have not seen this in the county.

G. palustre, L. var. **elongatum,** Prest.—(VII.) Edge of Brittas Lake, Knock Drin.

G. uliginosum, L.—Lisclogher bog; Scraw bog, Loughanstown; bog of Lynn; shores of L. Drin and L. Owel.

Valeriana officinalis, L. var. **sambucifolia,** Mik.— Knock Drin and elsewhere; all the Valerians in this part of the county appear to be this variety.

Valerianella dentata, Poll.—Near Belvedere Lake, D. M. (*Cyb. Hib.*). I have not seen this.

Antennaria dioica, R. Br.—Knock Eyon, locally plentiful.

Achillæa Ptarmica, L.—Curraghbrack, not common in the county.

Anthemis Cotula, L.—Knock Drin.

Petasites vulgaris, Desf.—Ballynegall and Kilmaglish.

* **Doronicum pardalianches,** L.—(VII.) Killynon, Miss E. Reynell! Well established

Carlina vulgaris, L.—Knock Eyon and Knock Ross.

Carduus pycnocephalus, Jacq.—Roadside between Killynon and Reynella.

Cnicus pratensis, Willd.—At Ladestown, near L. Ennel.

C. Forsteri, Sm.—(VII.) N.W. end of L. Owel.

‡ **Centaurea Cyanus,** L.—(VII.) Knock Drin, in cultivated fields.

Crepis paludosa, Mœnch.—Scraw bog, Loughanstown, and shore of Derevaragh Lake, N. side of Knock Ross.

‡ **C. taraxacifolia,** Thuill.—Near Athlone and one or two other places, B. and V.

Hieracium umbellatum, L.—Hare Island, L. Ree, B. and V.

H. boreale, Fr.—Coosan point, L. Ree, B. and V.

Leontodon hirtus, L.—Shore of L. Derevaragh at Gartlandstown.

L. hispidus, L.—Fields near Creggan Lough, B. and V.

Sonchus asper, Hoffm.—Knock Drin; not previously definitely recorded from this county, but referred to Dist 7 by B. and V.

Vaccinium Oxycoccos, L.—Quarry Bog, Knock Drin, and Scraw-Bog at Loughanstown, where it is exceedingly abundant, forming dense masses. An abnormal growth of this plant is of frequent occurrence in both localities, caused by a fungus (*Exobasidium vaccineæ*, Worsin). "This fungus attacks *Ericaceæ* and *Vaccinieæ* of many genera in all parts of the world, and many Rhododendrons in the Himalaya, with a general similarity in its effects. Some quite small-flowered American *Andromedas* produce under it flowers nearly three inches in diameter." Thus writes my friend Mr. C. B. Clarke of the Kew Herbarium, to whom I sent specimens, and by whom the plant was submitted to Mr. Cooke and other fungologists at Kew.

V. Vitis-idæa, L.—Mr. A. G. More informs me that there is, in Dr. Moore's Herbarium, a specimen of this plant found on the greater bog of Bracklyn, which is about 280 feet above mean sea-level; I regret I have not had an opportunity of searching for it.

Andromeda polifolia, L.—Quarry Bog, Knock Drin, frequent in the county.

Pyrola rotundifolia, L.—Abundant in the 'Scraw bog,' Loughanstown, and Ballynegall, and sparingly in Lisclogher Bog.

P. minor, Sw.—This is said, in "Cyb. Hib." to have been found in the Ballygall (should be Ballynegall) demesne. I have searched carefully for the plant, but have not succeeded in finding it.

Primula veris x vulgaris, L.—Knock Drin old wood, rare.

Lysimachia vulgaris, L.—Quarry Bog, and N.W. end of L. Owel.

Samolus Valerandi, L.—Shore of L. Ennel at Ladestown.

Gentiana amarella, L.—Drinmore.

Myosotis cœspitosa, Schultz.—Edge of L. Derevaragh! not previously definitely reported from the county; but it is said to be more plentiful along L. Ree than any other of the genus, B. and V.

Lithospermum officinale, L.—Edmonton, Miss E. Reynell!

Solanum nigrum, L.—Knock Drin, several times seen in garden ground.

(TO BE CONCLUDED.)

RECORDS OF THE EXPORT OF IRISH WOLF-DOGS TO THE EAST IN THE 17TH CENTURY.

BY V. BALL, C.B., LL.D., F.R.S.

In his interesting "Notes on the History of the Irish Wolf-dog," [1] Prof. J. P. O'Reilly has given evidence of the importation of these dogs in the 17th and 18th centuries into Spain, where they were employed in keeping the wolves in check. I would refer to that paper readers who may desire to become fully acquainted with the subject, and with a philological investigation of the Continental terms which were applied to this variety of dog. Again, in his monograph on the Irish Wolf-hound [2] Capt. G. A. Graham has given much information about the export of these dogs to England in the 16th, 17th, and 18th centuries. Exportation appears to have been progressing too fast, however, and in fact threatening extermination of the breed; for we find that

"In 1652 a Council Order of Cromwell's Government prohibited the export of Wolf dogs, and offered rewards of £5 and £6 respectively for male and female wolves."

On the present occasion I propose to quote certain authors in connection with the actual export of Irish Wolf-dogs to the far East, and the high esteem in which they were regarded there at a still earlier period. In the year 1617, during an interview between the Emperor Jahangir and Sir Thomas Roe, the former having spoken slightingly of some presents which had been forwarded to the latter for distribution at Court, but which Jahangir had appropriated, added:

"I will keep them, and only desire you to help me to a horse of the greatest size. It is all I will expect, and a male and female mastiff, *and the tall Irish greyhounds*, and such other dogs as hunt in your lands, and if you will promise me this I will give you the word of a king I will fully recompense you, and grant you all your desires."

Sir T. Roe writes:

"I answered I would promise to provide them, but could not warrant their lives, and if they died by the way, only for my discharge their skins and bones should be preserved; he gave extraordinary bows, laid his hand on his heart, such kind gestures as all men will witness he never used to any man, nor such familiarity nor freedom, nor profession of love." [3]

[1] Proc. Royal Irish Academy (3rd Ser.), Vol. i., 1890.
[2] Dursley, 1885.
[3] Travels in India the 17th Century. London: Trubner, 1873, p. 91.

Rev. Edward Terry, Chaplain to Sir T. Roe, relates that in the present sent to Court, as above referred to, English and Irish dogs were included; but as only two out of eight arrived safely, it was for that reason that the Emperor desired more. He says:

"In the year I went to India, the merchants here (as from the King of England in whose name they sent all their presents), amongst many other things then sent the Mogul some great English mastiffs and some large Irish greyhounds, in all to the number of eight, dispersed in our several ships; one of these high-spirited mastiffs in our voyage thither, upon a day seeing a great shoal or company of porpoises, mounting up above the waves, and coming toward that ship wherein he was, suddenly leaped overboard to encounter with them, before any did take notice of that fierce creature to prevent that engagement, wherein he was irrecoverably lost, the ship then having such a gale of wind, that she could not suddenly slack her course, whereby that poor creature might have been preserved. Another, one of the Irish greyhounds, had his head shot off in our sight. The mange was the destruction of four more of them, only two of the mastiffs came alive to East India, and they were carried up each in a little cart, when I went up to the Ambassador (at Agra) that he might present them to the Mogul." [1]

He then describes how one of them broke loose and attacked an elephant.

Another Chaplain, the Rev. J. Ovington, who made a voyage to Surat in the year 1689, relates that

"A couple of Irish Wolf dogs were so prized in Persia, that they were taken as a welcome and admired present by the Emperor (Shah) himself. Two more of which (which were given to me by the Earl of Inchequin when we put into Kingsale (*sic*) after the voyage) I disposed of to the East India Company, who despatched them in their ships immediately to the Indies, to be there bestowed on some of the Eastern Courts." [2]

He then relates, as an example of the value set upon European dogs, how a combat between the armies of two nobles, in consequence of a dispute as to the ownership of an English mastiff, was narrowly avoided by a reference to the English president who decided the merits of the respective claims.

---

[1] A Voyage to East India. London, 1777, p. 140.

[2] A Voyage to Suratt. London, 1696.

INSECTS COLLECTED BY THE ROYAL IRISH ACADEMY FLORA AND FAUNA COMMITTEE, 1893.

BY REV. W. F. JOHNSON, M.A., F.E.S., J. N. HALBERT, AND GEORGE H. CARPENTER, B.SC.

(*Continued from page* 89.)

COLEOPTERA.

THIS order of insects has yielded better results than any other. The following list of captures, with some notes on distribution, contains eighteen beetles (distinguished by an asterisk), which we believe to be new to Ireland. It is remarkable that some of the insects now recorded from Co. Donegal have in Great Britain a southern range, while several northern British forms have been discovered in the south-west of Ireland. We have to thank Dr. D. Sharp and Rev. Canon Fowler for identifying some of the more critical species.

CICINDELIDÆ.

Cicindela campestris, L.—Berehaven, common, especially in dry sandy places near the coast. This beetle seems widely spread in the south-west of Ireland, having been observed also at Slea Head, to the west of Dingle (August, 1889).

CARABIDÆ.

Carabus catenulatus, Scop.—Hungry Hill. Ballyhaise, in moss on trees. Slieve Glah, under stones.

C. glabratus, Payk.—Mountains between Adrigole and Glengariff.

C. clathratus, L.—Slieve Mishkish.

These three species have not been hitherto recorded from the south-west of Ireland. The occurrence of the two latter is of great interest, as further evidence for the northern and alpine character of a section of the fauna of this mild southern region.

C. nemoralis, Müll.—Coolmore. Ballyhaise, Oak Wood. Slieve Glah, remains under stones.

C. granulatus, L.—Coolmore. Slieve Glah, remains under stones; no living specimen found. Dursey. Near Killarney.

Notiophilus biguttatus, F.—Coolmore. Dundalk. Ballyhaise.

N. substriatus, Wat.—Coolmore. Cultragh Lough. Dursey; an addition to the fauna of S.W. Ireland.

N. aquaticus, L.—Coolmore. Ballyhaise.

N. palustris, Duft.—Coolmore.

Nebria brevicollis, F.—Cavan. Berehaven. Killarney, common.

Pelophila borealis, Payk.—Banks of R. Erne above Ballyshannon, under stones, pretty numerous.

Blethisa multipunctata, L.—Coolmore, in a marsh.

Elaphrus riparius, L.—Coolmore, and banks of R. Erne near Ballyshannon.

E. cupreus, Duft.—Coolmore, banks of R. Erne. Near Dundalk, in marshy field.

Clivina fossor, L.—Coolmore. Shores of Lough Oughter.

Dyschirius politus, Dej.—Coolmore, on sandy beach in company with *Bembidium pallidipenne*, both appearing to prey upon the *Bledii* which abounded in the same spot.

D. globosus, Herbst.—Coolmore, under stones by a small stream.

Broscus cephalotes, L.—Coolmore, very numerous.

Badister bipustulatus, F.—Coolmore. Near Cavan.

Chlænius nigricornis, F.—Coolmore, and banks of R. Erne near Ballyshannon.

Bradycellus verbasci, Duft.—Coolmore.

Harpalus rupicola, Sturm.—On the shore at Greenore. This is the only locality as yet for this beetle in Ireland. Rev. W. F. Johnson took it there in 1888, *vide Ent. Mo. Mag.*, vol. xxv., p. 140. In England it seems confined to the east and south.

H. ruficornis, F.—Coolmore.

H. æneus, F.—On the beach at Greenore.

H. latus, L.—Ballyhaise.

Pterostichus cupreus, L.—Coolmore.

P. versicolor, Sturm.—Bere Island, a very dark form.

P. madidus, F.—Coolmore. Near Cavan, common.

P. niger, Schall.—Fathom. Dundalk.

P. vulgaris, L.—Coolmore. Slieve Gullion. Fathom.

P. anthracinus, Ill.—Common under stones on Lough Oughter shore. The only other Irish record is "near Belfast" by Haliday.

P. nigrita, F.—Coolmore. Berehaven. Shores of Lough Oughter.

P. gracilis, Dej.—Shores of Lough Oughter.

P. minor, Gyll.—Shores of Lough Oughter.

P. strenuus, Panz.—Coolmore.

P. diligens, Sturm.—Shores of Lough Oughter.

P. striola, F.—Coolmore. Slieve Gullion. Berehaven; this seems the commonest *Pterostichus* in the south-west, being found by everyone who collects in the district.

Amara spinipes, Duft.—Coolmore.

A. bifrons, Gyll.—Coolmore.

A. communis, Panz.—Coolmore.

Calathus cisteloides, Panz.—Coolmore.

C. fuscus, F.—Coolmore, at roots of *Ammophila*.

C. melanocephalus, L.—Coolmore.

var. **nubigena**, Hal.—Coolmore. Slieve Glah. Dursey. This interesting melanic variety was until lately known only from considerable altitudes. Two of the above localities, however, are near the sea-level. Dr. Scharff also has taken it on the Aran Islands in Galway Bay, at a moderate elevation. It occurs also on the Faroë Islands.

C. piceus, Marsh.—Ballyhaise, Oak Wood.

Taphria nivalis, Panz.—Coolmore.

Anchomenus angusticollis, F.—Banks of R. Erne above Ballyshannon under stones, pretty numerous.

A. albipes, F.—Coolmore. R. Erne. Cavan. Hungry Hill, common.

A. oblongus, Sturm.—Shores of Lough Oughter, very common under stones.

A. marginatus, L.—Coolmore.

A. parumpunctatus, F.—Coolmore. Shores of Lough Oughter. Killarney.

A. viduus, Panz.—Shores of Lough Oughter.

A. micans, Nic.—Shores of Lough Oughter.

A. fuliginosus, Panz.—Ballyhaise.

A. gracilis, Gyll.—Coolmore.

Bembidium rufescens, Guer.—Coolmore, common in tufts of grass on the cliffs. Near Ballyhaise in moss on banks of R. Annalee.

B. obtusum, Sturm.—Shores of Lough Oughter.

B. Mannerheimi, Sahl.—Coolmore.

B. Clarki, Daws.—Coolmore. The only other Irish record is Armagh.

B. lampros, Herbst.—Coolmore. Dursey.

* **B. nitidulum**, Marsh—Coolmore, under stones in a damp piece of ground close to the beach.

B. femoratum, Sturm.—Coolmore, in company with the last.

B. bruxellense, Wesm.—Shores of Lough Oughter.

B. saxatile, Gyll.—Coolmore with *B. femoratum*.

B. littorale. Oliv.—Coolmore. Shores of Lough Oughter.

B. pallidipenne, Ill.—Coolmore, in great numbers on the sandy beach, evidently preying on *Bledii*.

Trechus lapidosus, Daws.—Coolmore, rare.

T. minutus, F.—Coolmore.

Dromius linearis, Ol.—Coolmore. Carlingford.

D. quadrimaculatus, L.—Ballyhaise under bark. Killarney.

D. melanocephalus, Dej.—Near Cavan, common.

HALIPLIDÆ.

Haliplus ruficollis, DeG.—Coolmore. Lough Oughter, in drains.

DYTISCIDÆ.

Laccophilus interruptus. Panz.—Coolmore, in drains.

L. obscurus, Panz.—Lough Oughter, in drains.

Cœlambus quinquelineatus, Zett.—Coolmore. Lough Oughter, in drains.

C. novemlineatus, Steph.—Coolmore, plentiful in a drain leading into a brackish piece of water. The only other Irish locality is Armagh.

C. impressopunctatus, Sch.—Coolmore, plentiful in company with the last named species. The other Irish records are Waterford (the late Dr. Power) and Killarney (Mr. Wollaston). A single specimen has occurred at Armagh.

Hydroporus vittula, Er.—Coolmore.

H. palustris, L.—Coolmore. Lough Oughter, in drains.

H. erythrocephalus, L.—Coolmore.

H. obscurus, Sturm.—In a small pool near the top of Slieve Glah.

H. pubescens, Gyll.—Lough Oughter, in drains.

H. lituratus, F.—Lough Oughter, in drains.

Agabus sturmii, Gyll.—Coolmore.

A. bipustulatus, L.—Coolmore. Lough Oughter, in drains.

Ilybius fuliginosus, F.—Lough Oughter, in drains.

I. ater, DeG.—Coolmore.

Dytiscus punctulatus, F.—Lough Oughter, in drains.

GYRINIDÆ.

Gyrinus natator, Scop.—Coolmore.

* **G. elongatus**, Aubé—Coolmore, in pools.

G. bicolor, Payk.—Coolmore. Armagh is the only other Irish locality.

G. marinus, Gyll.—Berehaven.

* **G. opacus**, Sahl.—Adrigole. An interesting addition to our Irish fauna, especially as it appears to be a northern species in Great Britain, yet occurs here in the south-west.

(TO BE CONTINUED.)

NOTES ON OCCURRENCES OF THE MARTEN *(MARTES SYLVATICA)* IN ULSTER.

BY ROBERT PATTERSON, F.Z.S.

Up to the year 1879 two species of Marten were supposed to inhabit the British Islands, the Pine Marten and the Beech Marten. The chief external difference was in the breast-spot; in the Pine Marten it was yellow or cream-colour; in the Beech Marten it was white or whitish. There were other slight external differences, and the shape of the skull and size of the teeth were supposed to distinguish the two species. The habits of the two were also said to be different, the Pine Marten frequenting Pine trees, and the Beech Marten Beech trees, as well as mountains and rocks, while the latter was said to be much more bold and daring.

In 1879 the late Edward Alston, who was an authority on the subject, stated that in his opinion the Beech Marten (which is the common Marten of the Continent) is not, and never was, a member of the British fauna. "During the last ten years" (1869–79), he adds, "I have missed no opportunity of examining native Martens, and have endeavoured to trace out every supposed Beech Marten that I could hear of. I have thus seen a very large number of specimens from various parts of England, Wales, Scotland, and Ireland, and every one has proved to be *Martes sylvatica*, the Pine Marten." It is greatly to the credit of our Irish naturalist, the late William Thompson, of Belfast, that, prior to 1852, he had arrived at somewhat similar conclusions, remarking that the yellow colour on the breast of the young gave place to white in the adult. He considered this a satisfactory explanation of the fact that the yellow-breasted form should be the more common with us, as the *young* of all animals more easily fall victims to man. Of thirteen Martens received by Mr. Sheals, taxidermist, Belfast, not one had the white breast.

Martens are very destructive to every kind of game, and consequently are trapped and killed by game-preservers on every occasion. They reside chiefly in trees, and prey upon birds, squirrels, and other small animals. But they will also descend to the ground and destroy not only mice, rats, rabbits, and hares, but even lambs. Thompson relates that a farmer in the

neighbourhood of Donard Lodge, Co. Down, "had fourteen out of twenty-one lambs killed in one night, and the destroyers contented themselves with sucking the blood of their victims. On the following night the remaining seven were treated in a similar manner, and a couple of Martens were seen taking their departure from the scene of devastation." They were traced, and were found to have taken up their abode in a deserted Magpie's nest in Tollymore Park. In 1881, as I am informed by Mr. Ussher, a mother and two big young Martens were killed at Oaklands, Co. Wexford. There had been a destruction of lambs in the vicinity which was attributed to Stoats, but the bites in the necks were larger than those made by the latter animal. We need not therefore be surprised that the Marten is becoming rare, in Ulster at all events. In the following brief notes on its occurrences in our province, I begin on that foundation-stone of most branches of Irish Zoology—Thompson's "Natural History of Ireland." I have to thank many landlords and game-keepers for information cheerfully given, and I have especially to thank Mr. Sheals, of Corporation-street, Belfast, for valuable records taken from his books. I give the counties in alphabetical order.

Co. Antrim.—Thompson mentions the following localities where the Marten has occurred:—Glenarm Park, Glenariffe, Shane's Castle Park, vicinity of Larne, Tullamore Lodge, Castle Dobbs, and Malone House, within four miles of Belfast. At the latter place, he says, a pair of Martens were discovered in possession of a Magpie's nest; similar cases occurred in Tollymore Park and Belvoir Park, Co. Down. In the Belfast Museum the only Ulster specimen we had until quite lately is labelled "Toome Bridge, Co. Antrim, May, 1851." About forty years ago one was trapped at Garron Tower. In 1866 two were trapped in Glenarm Deer-park, as I am informed by Lord Antrim. In 1871 one was taken at Shane's Castle, and another in 1884 at Glenarm—a very fine specimen, weighing 5 lbs. Then comes an interval of nine years, during which I have no records from Co. Antrim, until last year—1893—when three specimens were taken—one in Glenarm Park in February, one in March at Portglenone, and one in May at Templepatrick. Mr. Montgomery, of Benvarden, Dervock, informs me that one of his game-keepers saw last spring an animal which, from his description, seems to have been a Marten, and as Portglenone is only about 12 miles distant, this was probably the one trapped in March. Lord Templetown's game-keeper informs me their specimen was the first seen there for over 45 years.

Co. Armagh.—Lord Gosford's demesne, Churchhill, and Tanderagee are given by Thompson. Sir Wm. Lenox-Conyngham writes me that one was caught at Churchhill about 25 years ago, and the specimen is

preserved. One was taken at The Argory about 24 years ago, as I am informed by Captain Shelton, who kindly sent me the skin for inspection.

Co. CAVAN.—No records.

Co. DONEGAL.—Thompson says:—"J. V. Stewart notes the yellow-breasted Marten in his catalogue of the mammalia of this county." It is also mentioned by the late Col. J. Whyte. About 25 years ago a pair nested in the thatch of an outhouse near Coxtown. Major Hamilton, of Ballintra, writes that in one year, between 1865 and '70, he shot one and trapped another, and he had trapped some before these dates. He says, "They used to steal plums on the garden wall, and be caught on "the top of it, but I cannot tell the dates or numbers. I have never "seen any since, though I have heard of one." Mr. H. C. Hart saw one at Glenalla in 1879, and in 1880 two were obtained, one at Horn Head, and one at Ards. About 1883 two were trapped in a demesne three miles from Ballyshannon, and in September, 1883, one was killed not far from the town of Donegal. Some years ago two were taken on a mountain near Glenties. I am informed they have been occasionally seen in Glen Veagh and near Lough Esk.

Co. DOWN.—In this county Hillsborough Park, Tollymore Park, Donard Lodge, and Belvoir Park, are mentioned by Thompson as former haunts. There were some in Portavoe in 1854. In 1874 or '75 one was trapped near Castlewellan, as Dr. Gray kindly informs me. This specimen measures 2 feet 7½ inches over all. In 1882 one was killed at Castle Ward, near Downpatrick, and a particularly fine specimen from Narrow-Water Castle was received by Mr. Sheals in January, 1886. In April, 1891, one was trapped at Finnabrogue, Downpatrick, and was most generously mounted and presented to the Belfast Museum by Major Maxwell. In October of the same year (1891), another was killed by Lord Roden's keeper at Bryansford. It measured 28 inches, weighed 3½ lbs., and had evidently been trapped before, as one foot was gone. Two were taken some years ago at Montalto, Ballynahinch.

Co. FERMANAGH.—Thompson's only locality in this county is Florence Court. In former times it was frequently found in wooded demesnes along the shores of Lough Erne, but now seems very rare. The last Marten seen at Florence Court was killed by Lord Enniskillen about 30 years ago. One was got in July, 1869, at Killaleas, Lough Erne. The Earl of Erne kindly sends me the following information. "About 20 years "ago, I killed a Marten Cat while cover-shooting on an island in Lough "Erne, forming part of the Erne demesne. I never saw one there before "or since. I recollect an old man, tenant of a farm on the island, who "happened to be with me at the time, saying that they were very plenti-"ful when he was a boy, but that he had not seen one for at least 40 years." Captain Archdale states that Martens were not at all uncommon about Irvinestown 70 years ago, and that they were very destructive to wall-fruit. It is 14 years since one was shot at Castle Archdale, and for 20 years previously they were only occasionally seen.

Co. LONDONDERRY.—Thompson mentions Castledawson; I have no recent records.

Co. MONAGHAN.—My only note for this county is one on the authority of Sir John Leslie, who informs me that a Marten was trapped by his keeper at Glasslough in 1891.

Co. TYRONE.—On the 24th June, 1887, Mr. Sheals received a Marten from Cookstown; I have no other records.

I am well aware this list of recent occurrences must be very far from complete, but I would express the hope that the publication of it will be the means of bringing in fresh information about this interesting and scarce animal. Almost nothing is known about its occurrences in Counties Armagh, Cavan, Londonderry, Monaghan, and Tyrone, and I shall be very grateful for notes from these counties. All communications addressed to me at Malone Park, Belfast, will be promptly acknowledged.

PROCEEDINGS OF IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent donations comprise fresh-water fish from F. Godden, Esq.; two pairs of Pigeons from J. B. O'Callaghan, Esq.; and a Heron from T. Harey, Esq. Twelve monkeys and forty Water-fowl have been acquired by purchase.

12,900 persons visited the Gardens in March.

DUBLIN MICROSCOPICAL CLUB.

MARCH 15th—The Club met at Mr. W. ARCHER'S.

PROF. COLE exhibited a section and specimen of a Variolite (altered coarsely spherulitic basalt glass), from near Ballagh Bridge, coast of Mourne, a fifth locality for this rare rock in the British Isles. The distinction between the dusky spherulites and the green altered glassy groundmass is well seen in this example, which is, as in other cases, clearly the result of rapid cooling of a basalt dyke.

Professor Cole also exhibited a section from another of the numerous dykes of Mourne, in which skeleton-crystals of the constituents of basaltic andesite have developed with a beauty and abundance such as occurs more usually in artificial slags.

PROF. T. JOHNSON exhibited a living specimen of *Halosphaera viridis*, Schmz., a minute globular green alga, which was found floating at the surface of the sea by the exhibitor, when with the fishery survey boat "Harlequin," in April, 1891, off the coast of Galway. The material exhibited had been sent from Plymouth by Mr. Garstang, who had taken it there in the tow-net for a month past. The life-history of the weed is incompletely known, and it is hoped, by the examination of specimens now under cultivation, to make it known. *Halosphaera* was first observed at Naples, several years later at Plymouth, by Mr. Cunningham, and in 1891 along the south and west coasts of Ireland. As a source of food supply and as an oxygenator of the sea-water it must be regarded as an important economic *plankton* member.

Mr. G. H. CARPENTER showed female specimens of *Orthezia cataphracta*, Shaw, collected at the foot of Slieve Glah, Co. Cavan, by Mr. J. N. Halbert. This insect belongs to the *Coccidæ*, and is covered with a white, waxy secretion, arranged in symmetrical plates. Two of these project

behind the body, forming a marsupium or pouch in which the eggs are carried. The winged male is very rare. This is a northern species ranging through Lapland, Greenland, Scotland, and northern England and Ireland; it has been found in recent years in the Styrian Alps. Mr. H. C. Hart was the first to notice it in Ireland (in 1880), in Cos. Donegal and Wicklow. Rev. W. F. Johnson has also found it near Armagh.

Mr. DUERDEN exhibited slides of *Campanulina turrita*, obtained from various parts of the coast of Ireland. This species, so far as is known, has only been obtained from Irish waters. It was first found by Professor Wyville Thomson in Belfast Lough, and the description of the species in Hincks's "Brit. Hydroid Zoophytes" is based upon his figure. At an early stage the colony is of a very simple type, single hydrothecæ rising from the creeping stolon. Later the colony becomes larger, and much branched. A fine colony, bearing the gonothecæ, was shown growing on the spider-crab *Stenorhynchus rostratus* and extending even to the ends of the antennæ.

Mr. H. H. DIXON showed longitudinal sections of the ovules of *Galanthus nivalis* and *Hyacinthus orientalis* stained in mixtures of saffranine and iodine green, and also of fuchsin and iodine green. With these stains the polar nuclei and the secondary nucleus of the embryo sac become red, while the nuclei of the antipodal cells become brilliant blue, *i.e.* the former are erythrophil, and the latter cyanophil. The synergidæ and the oosphere are faintly cyanophil. The nucleolus of the antipodal cells is small and stains brilliant red. There is a large red nucleolus in the oosphere. In the nuclei of the endosperm formed later on, there are very large and brilliant red nucleoli which, as is usual, are situated in a vacuole in the nucleus.

Mr. M'ARDLE exhibited *Colurolejeunea calyptrifolia*, Hook, a rare liverwort which is very minute, and is generally found growing epiphytic on the larger Hepaticæ. The leaves are two-lobed, the superior the largest, which is elongated and formed into a shape which, in no small degree, resembles the calyptra of some mosses; the opening at the base in the younger leaves is overlapped by half the sub-quadrate inferior lobe; the stipules (underleaves) are oblong, closely adpressed and deeply divided into two acute lobes. The specimens were collected at O'Sullivan's Cascade, Killarney, by exhibitor, in November, 1893. The plant is also remarkable as being the only British representative of the five known species which are placed in the genus by Dr. R. Spruce in his work on the Hepaticæ Amazonicæ et Andinæ. Mr. M'Ardle drew attention to an interesting article on the "Adaptation in Liverworts," published in the March number of *Natural Science*, by Mr. Jesse Reeves.

BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

APRIL 3rd.—Prof. WILLIAM KNIGHT, LL.D., lectured on the Higher Education of Women.

BELFAST NATURALISTS' FIELD CLUB.

MARCH 20th.—This was the annual meeting of the Microscopical Section. The Secretary of the Club (Mr. F. J. BIGGER) read the report of the Section, which was adopted. Mr. P. F. GULBRANSEN read a paper entitled "Why do objects appear larger when viewed through a Microscope?" The Microscopical Committee was re-elected, with the addition of the name of Prof. Symington. The meeting then resolved itself into a conversazione, and the members examined the large display of microscopical objects and apparatus that was spread on the tables.

MARCH 29th.—Mr. WILLIAM GRAY, M.R.I.A., gave a lecture on the Holy Wells of Ireland.

APRIL 10th.—Mr. GEORGE COFFEY, M.R.I.A., delivered a lecture on the Pagan Cemeteries and Burial Customs of Ancient Ireland.

Dublin Naturalists' Field Club.

April 10th.—The President (Mr. G. H. Carpenter) in the chair. Prof. Johnson, D.Sc., gave a short account of a group of microscopic plants which Bornet and Flahault in 1889 showed were active in the gradual but complete disintegration of empty molluscan shells. The perforating plants belong to the blue-green, green, and red sea-weeds, and in two instances to fungi. They are especially abundant in oyster, cockle, and razor shells, which they colour green, grey, &c. Half of the known species have been found within the last few years on different parts of the Irish coast, partly by expeditions under the auspices of the Royal Irish Academy. Reference was made to the discovery within the last fifty years by Carpenter, Duckett, Moseley, Duncan, and others of similar if not identical plants in recent and fossil corals, in foraminifera, fish scales, and calcareous pebbles. It was also mentioned that some of the boring plants are found in fresh water and also in shells of living animals.

Mr. J. E. Duerden, A.R.C.S., gave a paper on "Irish Polyzoa." He described the structure of those minute zoophytes, of which some form the horny skeletons popularly known as "sea-mats." At one time they were regarded as plants. Figures were thrown on the screen of some of the rare forms which have been dredged by the various surveys of the Royal Irish Academy. Several of the interesting fresh-water species obtained by Professor Allman from the Irish canals and other localities were next dealt with. At the close a demonstration was given of many of our common Irish forms, and rarer specimens were exhibited under the microscope. The President and Mr. R. Lloyd Praeger took part in the discussion which ensued.

Mr. Greenwood Pim exhibited a fine specimen of a fungus, *Morchella* near *Smithiana*, but possibly distinct, sent him on the previous day by a member of the Club, Mr. W. F. De V. Kane, from Ahascreagh, Co. Galway.

Mr. Praeger then exhibited specimens from Co. Armagh and Co. Derry of the very rare orchid *Spiranthes Romanzoviana*. He said that in the whole of Europe this plant was known to grow only in Ireland. For many years it was known only from Co. Cork, but its recent discovery in Armagh and Derry should encourage botanists to seek it elsewhere in this country, and he urged members visiting boggy districts in August, to look for this plant, which was as beautiful and interesting as it was rare.

Cork Naturalists' Field Club.

April 11th.—Annual Meeting. Prof. Hartog, President, in the chair. The Treasurer's statement, showing a balance in hand of over £10, and the Report of the Committee were submitted and adopted. The Report states that the formation of the Club has interested and stimulated many in the study of natural history, and asks that increased zeal may be shown by the members in the coming year. The want of a club-room and museum is felt to be a drawback to the Club's work. The following officers were elected :—President—Prof. Hartog ; Vice-Presidents—Mr. D. Lane, Mr. W. H. Shaw, Miss Martin; Hon. Treasurer—Mr. J. Gilbert; Curator—Mr. R. H. Phillips; Hon. Secretaries—Messrs. J. L. Copeman and Barrington ; Committee—Mrs. J. H. Thompson, Messrs. J. H. Bennett, H. Lund, O. R. Bergin, D. Hunter, S. Harrington, J. Noonan, T. Dillon, J. M'Kenzie, and J. Porter.

Limerick Naturalists' Field Club.

March 6th.—A series of photographic lantern slides, showing various forms and stages of Pond Life, were exhibited by the aid of Mr. B. Barrington's lantern, also living specimens of *Volvox*, *Hydra*, *Cyclops*, *Stentor*, &c.

MARCH 20th.—Mr. J. STEWART delivered an interesting address descriptive of ants, their habits, varieties, and distribution, illustrating the subject by means of some very beautifully-coloured diagrams and lantern transparencies, also living specimens from this neighbourhood.

ROYAL DUBLIN SOCIETY.

FEBRUARY 21st.—A paper upon Eozoonal Structure in the limestone rock of Monte Somma, by DR. J. W. GREGORY, F.G.S., and PROF. H. JOHNSTON-LAVIS, F.G.S., was communicated by Prof. Cole. The authors show that the limestone blocks of Mesozoic age in Monte Somma (Vesuvius) have frequently become metamorphosed into crystalline masses consisting of alternating bands of calcite and various silicates. The authors regard the silica, magnesia, &c., as derived from the igneous rock, by chemical interpenetration and interaction. Where the silicate, as often happens, is olivine (montecellite), or a pyroxene, a complete simulation of the structure of the supposed foraminifer *Eozoon canadense* is produced; the layers of silicates occur parallel to the surfaces of any igneous vein that may have intruded into the limestone, and they become closer to one another in the areas farther removed from contact. The "proper wall," the "stolons," and in places the "canal-system" of *Eozoon* are recognisable under the microscope; and the authors adduce evidence to show that the typical Eozoonal limestone of Canada may have arisen similarly as a product of contact-metamorphism.

Prof. GRENVILLE A. J. COLE, M.R.I.A., F.G.S., read a paper on Derived Crystals in Basaltic Andesite of Glasdrumman Port, Co. Down. A large composite dyke shows at this point a band of andesite on each side, from 4 to 17 feet wide, and a more recent dyke of eurite in the centre, 36 feet across. The eurite includes numerous blocks of andesite, and sends off veins into it; but the pyroxene and glass of the latter rock have become remelted at the contact, a delicate interpenetration of the two magmas has occurred, and the porphyritic crystals of quartz and pink felspar from the eurite are found completely surrounded by the dark andesite. Thus a pre-existing rock comes to include crystals derived from one that has subsequently invaded it, and hand-specimens, apart from study in the field, would be of a most misleading character.

NOTES.

BOTANY.

PHANEROGAMS.

Artemisia Stelleriana in Ireland.—Mr. Colgan follows up Prof. Areschoug's article in the March number of the *Journal of Botany* on the position of *Artemisia Stelleriana* in the European flora, by an examination of its claim to a place in the Irish flora, written in his usual careful style, and published in the April number of the same journal. Mr. Colgan's conclusion is that there can be no doubt that this plant is an introduction in its habitat on the North Bull. It appears that the plant was cultivated for many years at St. Anne's, and that the refuse from the garden there was shot on the foreshore within half-a-mile of where the plant now grows. Given a westerly wind and a rising tide, a few scraps of the *Artemisia* have floated across the narrow channel to the North Bull, and, as the plant is a particularly hardy and free-growing species, the mystery of its appearance is solved.

ZOOLOGY.

Fauna of Mulroy Bay, Donegal.—On August 14th last, Mr. R. D. Darbishire and Rev. A. H. Delap carried out some dredgings in Mulroy Bay, North Donegal. I am indebted to the kindness of these gentlemen for the notes, list of mollusca, and slide of foraminifera, from which the present note is compiled. Particulars:—Four dredgings taken with an 18-inch dredge in north loop of Mulroy—(1.) W. of Croghan Island, 21-25 fathoms; (2.) N. by W. of Croghan Island, 18-19 f.; (3.) S. and E. of Doherty's rock, 17-18 f.; E. of Lamb Island, 23-27 f. The result in all four scrapes was very similar—a fine, thick, black mud, not putrescent, with a little gritty sand and a few sharp quartz pebbles; only a few shells, live and dead. One or two scrapes were also taken at the mouth of Moross Channel, in a few fathoms depth; the dredge brought up abundance of living *Lima hians* from 2 f., on a sandy bottom, and from 5 or 6 f. in its nests among *Laminaria*; also a small feather-star in the stalked stage. The results were, as Mr. Darbishire remarks, very disappointing, and the fauna remarkable for its poverty; nevertheless, there are one or two interesting species, as I shall point out; and so little marine work has been done in Donegal that any acquisition to the knowledge of the fauna is desirable.

Mollusca (determined by R. Standen):—*Lima hians* (Gm.)—alive and plentiful; *Mytilus edulis*, L. (young); *Montacuta bidentata* (Mont.)—valves; *Kellia suborbicularis* (Mont.)—valves; *Axinus flexuosus* (Mont.)—alive and plentiful; Mr. Darbishire writes that it came up alive in every haul; *Cardium edule*, L. (young); *Venus ovata*, Penn.—dead; *Tellina tenuis*, Da C.—valves; *Corbula gibba*, Olivi—a few alive, small; *Panopea plicata* (Mont.)—valves; *Saxicava rugosa* (L.)—valves; *Cyclostrema nitens* (Phil.); *Rissoa inconspicua*, Ald.; *R. striata*, (Ad.); *Turritella terebra* (L.); *Odostomia scalaris* (Phil.); *O. acicula* (Phil.); *O. spiralis* (Mont.); *O. interstincta* (Mont.); *O. insculpta* (Mont.); *O. pallida* (Mont.); *O. rufa*, Phil.; *O. turrita*, Han.; *O. unidentata* (Mont.); *Cerithium reticulatum* (Da C.); *Utriculus truncatulus* (Brug.); *Cylichna umbilicata* (Mont.). All the above univalves were dead. One or two species in the above list call for remark. *Lima hians* has been already recorded as plentiful at Moross by Mr. Hart (*Zoologist*, 1892); and this second note of its abundance there is interesting, as, excepting a single specimen dredged many years ago by the Ordnance collectors off Belfast Lough (Thompson), and another in the same locality by Groomsport fisherman (Proc. Belfast Nat. Hist. Socy., 1859) there is no other record of this pretty shell from Ulster. *Montacuta bidentata* is a rare shell in Ulster. *Axinus flexuosus*, though widely distributed, has apparently not been previously taken alive on our northern coasts. *Panopea plicata*—I know of no previous Irish record for this as a recent shell; it occurs in the estuarine clays of Belfast (Stewart) and Magheramorne, near Larne (Bell). *Odostomia rufa* (type) has not been previously recorded from the northern coasts, though its var. *fulvocincta* is not uncommon; I have to thank Mr. J. T. Marshall for kindly confirming the determination of this shell. Several of the other *Odostomiæ*, *Cyclostrema nitens*, and *Utriculus truncatulus*, have only once or twice been previously recorded from the northern province, and additional stations are welcome.

Foraminifera (determined by Joseph Wright, F.G.S.):—*Biloculina depressa*, d'Orb; *Miliolina seminulum*, Linn.; *M. sclerotica*, Kar.; *Haplophragmium canariense*, d'Orb; *Verneuilina polystropha*, Rss.; *Virgulina Schreibersii*, Cz.; *Bulimina pupoides*, d'Orb; *B. marginata*, d'Orb; *Bolivina lævigata*, Will.; *B. punctata*, d'Orb; *Lagena lævis*, Mont.; *L. lineata*, Will.; *L. gracillima*, Seg.; *L. sulcata*, W. and J.; *L. Williamsoni*, Alcock; *L. semistriata*, Will.; *L. squamosa*, Mont.; *L. hexagona*, Will.; *L. lævigata*, Rss.; *L. lucida*, Will; *Nodosaria scalaris*, Batsch.; *Cristallaria crepidula*, F. and M.; *Uvigerina angulosa*, Will.; *Discorbina rosacea*, d'Orb; *Rotalia beccarii*, Linn.; *Nonionina depressula*, W. and J.; *Polystomella crispa*, Linn.; *P. striato-punctata*, F. and M.

Mr. Wright (to whom my best thanks are due for the above list) remarks that the species are such as would be likely to occur in almost any gathering at moderate depths around our coast.

A list of the worms, ascidians, &c., as determined by Mr. Darbishire and Prof. Herdman, is not at present available. The Holothurian *Synapta inhærens* was taken, and the gephyrean *Phascolosoma vulgare* in the deeper water.—R. Lloyd Praeger.

INSECTS.

Early appearance of Butterflies.—The present season promises to be an early one. I caught a very fresh specimen of *Lycæna argiolus*, a female, on the 26th of March, and on the 8th of this month (April), I saw a specimen of *Pararge egeria* in my garden. The Azure Blue is very common here in the woods of Curraghmore. One brood only has been observed, viz., in the spring—though I have often searched for it during the summer months. On looking over my note book I find that the above-mentioned dates are the earliest that I have observed these butterflies.—William W. Flemyng, Coolfin, Portlaw, Co. Waterford.

Coleoptera at Bray.—On one of the fine days towards the end of March I collected for a few hours on Bray Head; many of the common Coleoptera were taken as well as a few local species, the latter perhaps worth recording. On the Head *Notiophilus aquaticus* was common, darting about at roots of heath; from under stones and in moss I obtained examples of *Bradycellus harpalinus*, *Byrrhus pilula*, *Orthocætes setiger* (previously recorded from Portmarnock); by searching the trunks of fir trees about the foot of the hill, three good species of Coccinellidæ were secured, *Anaitis ocellata* (the variety with white surrounding the spots), *Adalia obliterata*, and a nice form of *Mysia oblongoguttata*. On the heath *Lochmæa suturalis* and *Ceuthorrhynchus ericæ* occurred commonly; and last but not least *Phlœophthorus rhododactylus*, an interesting beetle living in the dead stems of furze and broom; it is apparently widely distributed over England and part of Scotland, but I can find no previous record from Ireland.—J. N. Halbert, Dublin.

Stridulation of Corixa.—I have been asked to write an account of the stridulation of a *Corixa* I had in my possession for a short while. It was brought in a bottle of water from some distance in the country, but as I had had many of the same genus before, I took no particular notice of it. For two days after its arrival, however, I was worried by a sound, which I thought was produced by a cricket, but I could not locate it. On the third day I traced it to the vicinity of the jar, but had not the faintest idea that a water-insect was capable of making such a sound. The next day I caught the note distinctly as proceeding from the insect; at once I removed it to a clearer jar and began to watch it. I found that the sound was made by the rapid vibration, the clapping together, in fact, of two appendages, ivory-white like the smaller legs, that came into view between them while in use and then disappeared again. There were two different notes, one rather rare, but which when used preceded the more common one, was like the twittering of a bird and was produced by an upward rather than a lateral motion of the organs. The other, the principal note, was like the cry of the grasshopper I have heard abroad; it was very acute and shrill. I could hear it through much louder noises and through my own voice when reading aloud. It sang at intervals during the day, but regularly in the evening for hours; if the light were let in on it suddenly it stopped until the curtain was dropped again. This continued for eight or ten days when the creature died.—M. Thompson, Cork.

[This observation is of very considerable interest, as Mr. E. Saunders,

F.L.S. (with whom we have corresponded on the subject), tells us he has never heard of stridulation in these insects. He writes :—

"I cannot see what organs could be intended as the appendages 'like smaller legs,' I can only imagine that the coxæ must be meant, possibly, in a state of excitement, the legs might move rapidly and the coxæ show themselves unusually plainly, while all the time the stridulating noise might proceed from other organs altogether, no clapping together of the coxæ could produce a sound like a grasshopper's chirp as far as I can see—though the twittering mentioned might be due to such action."—EDS.]

AMPHIBIANS.

Frogs in the Mourne Mountains.—On Easter Monday, March 26th, while standing on the shores of Lough Bingian, a small lake situated in the heart of the Mourne Mountains, at an elevation of 1,350 feet, my attention was arrested by a curious, soft, purring sound, apparently proceeding from the upper end of the lake, about one hundred yards distant. On investigation I found this noise to proceed from an immense gathering of frogs, which were splashing about in the shallow water, and surrounded by large quantities of spawn. Every moment a number of frogs would raise their heads above the level of the water, and give vent to this croaking, which, however, resembled nothing so much as the purring of a cat. I endeavoured to form some estimate as to the number of frogs, and came to the conclusion that there must have been between 500 and 1,000. I may mention that the hour was about 1.30 in the afternoon, and the sun very bright and warm.—W. H. F. PATTERSON, Strandtown, Co. Down.

BIRDS.

Spring Migrants.—While walking along Bush Bay, near Giant's Causeway, on 27th March, I observed three Sand-Martins (two females and one male) flying backwards and forwards over the sand-dunes in the vicinity, as if they had just arrived. I had been on the look-out the previous day, but observed none. This locality is well suited for early arrivals on account of the heat arising from the sand, and the number of insects to feed on.—A. J. COLLINS, Belfast.

I heard the Chiff-chaff in Narrow-water Demesne, Co. Down, on March 24th. Mr. Robert Patterson writes me that he heard it at Belfast on March 25th. I heard the Corncrake at Cultra, Co. Down, on March 27th.—R. LLOYD PRAEGER.

It may be of interest that a Swallow was seen in Ormeau Park, Belfast, on April 5th. It did not stay here, but (as our earliest swallows seem to do) disappeared on the same day.—J. STELFOX, Belfast.

On Easter Sunday, 25th March, we saw about twelve House Martins flying along the Muckross shore of the Lower Lake, Killarney, and we were informed by our boatman that he had observed them there on the previous Tuesday, 20th March, and that he had never seen them at Killarney in other years before the first week in April. Mr. A. G. More informs us that this is exceptionally early. On 23rd March, near Newcastle, Co. Wicklow, we heard the Chiff-chaff. The Corncrake was heard on the evening of the 17th of April at Glenageary, Co. Dublin, and subsequent evenings.—R. W. SCULLY and H. J. SYNOTT, Dublin.

E. W. writes to the *Irish Times* of April 12th, that Swallows have been seen in the neighbourhood of Leixlip several times during the preceding few days.

H. RICHARDSON writing to the *Irish Times* on April 7th, says that Sand-Martins have arrived at Sletty, Queen's County.

T. J. D. writes to *Land and Water* for March 17th, that on March 8th a Cuckoo was seen in the neighbourhood of Waterville. The bird was observed by a number of persons.

MAMMALS.

The Reddish-grey Bat (Vespertilio Nattereri, Kuhl) in Co. Galway.—I have the pleasure of recording the capture of a male specimen of this rare bat in the demesne of Lord Clonbrock near Ahascreagh. I was out in search of moths on the 9th April, and caught it with my net. Noticing that its characters differed from the common Pipistrelle I forwarded it to the Dublin Museum, thinking that it might be the Whiskered Bat. The chief characters which distinguish *V. Nattereri* are the fringe of bristles which clothe the margin of the membrane between the point of the tail and the calcaneum (or spur which projects from the heel of the hind foot to support this part of the membrane). The fur is light reddish brown, lighter than all the British species, except *Vespertilio murinus*. The head is considerably raised above the face line, and the muzzle, which projects forward and somewhat upwards, is broad and prominent at the corners over the nostrils. The ears are longer than those of the Pipistrelle, and extend $\frac{1}{10}$-inch at least beyond the end of the nose, having a vertical outer lobe near the end of the outer margin well developed. The tragus (or inner ear membrane, so well known in the Long-eared Bat), is very long, narrow, and sub-acutely pointed. The measurement of this male exceeds that given of a female in the British Museum Catalogue, being of the head and body 2 inches, but the tail is shorter, namely 1·5 inch. In England this species has a wide but local distribution, and has occurred in church roofs as well as in a chalk pit reached by an underground shaft 70 feet deep. They are very social in their habits, and roost in masses clinging together for warmth. They are also found in Central Europe and on the Adriatic and Mediterranean littoral (Bell).

Specimens have been taken at the Scalp, Co. Wicklow, in 1845, and in Co. Longford by Mr. G. E. Dobson (Brit. Mus. Cat.); in Co. Donegal by Mr. H. C. Hart, and at Dundalk by Mr. Jameson, whose notice of Irish bats has recently appeared in this journal.—Wm. F. De V. Kane, Drumreaske, Monaghan.

The Marten in Ireland.—In the *Zoologist* for April, Messrs. G. E. H. Barrett-Hamilton, Robert Patterson, and J. J. Dowling supplement Mr. Harting's paper, in the previous month's issue, by notes of the occurrence of this animal in various parts of Ireland. Cavan, Louth, Limerick, and Roscommon appear to be the only Irish counties from which the Marten has not been recorded; but the list of counties in which the Marten is now extinct would undoubtedly be a much larger one.

GEOLOGY.

Geological Photographs.—We have received from Mr. R. Welch, Lonsdale-street, Belfast, a copy of his Catalogue of Irish Geological Photographs, a well printed pamphlet of 24 pages octavo. We welcome this catalogue as being a useful and original piece of work, and one which will be a boon to the student of Irish geology. Following the negative-numbers and titles of the photographs, are terse descriptions of the geological features exemplified in each, contributed by Professor Grenville Cole, F.G.S. Even in the absence of the photographs, these descriptive notes form interesting reading; and when taken in conjunction with the views, which are all up to Mr. Welch's well-known high standard of merit, the result is a production of much educational value. The subjects catalogued include peat-bogs, sands and gravels, Boulder clays, Cretaceous, Triassic, Carboniferous, Devonian, Silurian, and Cambrian strata; dykes, lava-flows, faults, and foldings. A large series is quoted illustrating denudation and erosion, and a second large series exemplifies fully the many interesting features of the basaltic plateau of Antrim.

The Irish Naturalist.

Vol. III. JUNE, 1894. No. 6.

THE HIGH AND LOW-LEVEL SHELLY DRIFTS AROUND DUBLIN AND BRAY.

BY T. MELLARD READE, F.G.S.

THERE has of late years been a great revival of interest in Glacial Geology, more especially as relates to our own country. The high-level shelly gravels have given enthusiastic glacialists both joy and tribulation. Joy where the facts fit in with one's favourite theories, and tribulation when we discover further and unthought-of difficulties in applying the pet hypothesis of the hour. Personally, my endeavour has been to preserve a philosophic calm befitting so difficult a subject, but whether it has been successful or not must be left to others to decide.

Very few geologists are aware of the great development of shelly drift extending from sea-level up to 1200 feet which exists in the neighbourhood of Dublin and Bray. Before I examined the district under the experienced guidance of the Rev. Maxwell Close, I was under the impression that all I should see at the higher levels would be sporadic patches of shelly sands and gravels. I was agreeably disappointed; for the continuity, extent, and bulk of the shelly deposits exceed any of those in the classic regions of England and Wales. These I had previously explored in a rather careful way, but the deposits in Ireland supplement and help to explain the better known deposits in England and Wales in some most important respects.

All that one can pretend to give in these few pages is a general conception of the high-level shelly drift, and its intermediate relations with the drift of the coastal margin; and to do this, the natural way is to describe the coastal deposits, and trace them up to the higher levels.

Beginning at the Hill of Howth, shelly sands and gravels are seen in considerable development from Howth to the Bailey Lighthouse. They extend to 300 feet above the sea-

level, and where the sections are best exposed, reminded me very much of the sands and gravels of Gloppa, near Oswestry, which occur 1100 feet above the sea-level. There is little doubt that at one time the whole of the present sea-cliffs of the Hill of Howth were buried in drift, which has been cut away by the action of the sea, leaving the drift in many places merely hanging onto a steep surface of Cambrian rocks at the top of the cliffs. Bailey Lighthouse is built upon a spur or promontory of drift based on Cambrian cliffs.

Let us now cross over Dublin Bay, and examine the splendid sections of sands, gravels, and boulder clay exposed in the cliffs of Killiney Bay. Here we may see and study a typical section of glacial-marine drift, and observe the curious way in which the several beds of sand, gravel, sand and gravel, gravel and boulders, and boulder clay, behave towards each other. In one place we see arched, in another horizontal stratification, elsewhere contorted bands occur, truncation of beds, lamination, and oblique bedding. Indeed, nothing but a careful section can give one any adequate conception of the nature of this drift. Marine shells, or shell-fragments, occur in all of these beds, excepting the horizontally bedded fine gravels near Ballybrack Station. We did not make any attempt to get a complete collection of shells, which would have taken a much longer time than was at our disposal, being principally occupied with drawing the section. We did, however, pick up *Astarte arctica*, *A. sulcata*, *Cardium edule*, *Mya truncata*, *Tellina balthica*, and other indeterminable fragments. These are among the commonest shells in glacial deposits.[1] This character of drift continues south along the coast, as far as the River Bray; but on nearing that river it is underlain by a hard, brown clay, which I call basement clay, with a pretty decided line of demarcation between them. The drift gravels, so far as described, consist, to the largest extent, of Carboniferous limestone, occurring as gravel, pebbles, and boulders—mixed with granite and Cambrian schists, and some flints, chert, &c. The basement clay, though containing these rocks, is much more largely made up of Cambrian schists, slates, and quartzites. These boulders can be seen

[1] Mr. Lloyd Praeger, in the present volume of this Journal, pp. 17, 18, gives a careful provisional list of the shells of the Killiney drift, naming the beds from which they are taken.

embedded *in situ* on the shore, so that their axial direction may be noted, when it appears that they are preponderatingly in a N.W. direction. The stones are often well striated, much more so than in the overlying drift, and the striæ point in the same north-westerly direction. The stones are not necessarily horizontal, but lie at varying inclinations. Shells occur in this clay. I took out a perfect *Turritella* and a fragment of a very large *Cardium*, having a highly porcellaneous glaze on the interior surface. Another curious feature is the presence of vertically-inclined beds of laminated clay, which penetrate both the basement clay and the drift overlying it. Vertical dykes of gravel also occur.

A microscopic examination of the materials of this basement clay showed that the larger grains were largely Cambrian grit and schist, mica schist, and vein quartz, black chert, black and grey limestone, quartzite, crystalline quartz, and a few exceedingly rounded minute pebbles of black limestone. In the smaller grains many well rounded and polished grains of quartz occurred, and many flakes of mica.

As illustrating this phase of the glacial deposits it will be well to pay a visit to the Bog Hall brickworks about one mile from Bray on the road to Kilmacanoge. The level of the deposit is, roughly speaking, about 200 feet above the sea-level. The clay of which the bricks are made is of a rusty brown colour, and there appeared at first sight to be an unusual proportion of Cambrian rocks among those which had been thrown out. A further examination showed that there were some large limestone boulders about, but these may have come from the upper part of the clay. The clay seemed to be separable into two beds. In the lower bed an excavation had been recently made, and all the rocks thrown out appeared to be Cambrian, Silurian, or granite. One block of Cambrian measured 3 feet 6 inches long, and was well-planed and striated. A block of quartzite conglomerate occurred, over 1 foot 8 inches long, and one granite boulder measured 3 feet in diameter. A mechanical analysis of a specimen taken of this clay told the same story, the larger residual fragments, after washing and riddling, consisting of Cambrian rocks, schists, grains of quartzite, quartz veins, &c. The smaller grains had a larger proportion of quartz grains from the disintegration of granite, but otherwise they were of the same character. What one would have hardly expected to find present in this

clay were highly polished and rounded quartz grains. Flakes of mica were common. All the residual material was non-calcareous and did not effervesce with acid.

On and beyond Bray Head to the southward, sands and gravels and boulder-clay of the shelly type continued. At the south side of Bray Head I picked up quite a number of pebbles of red Triassic sandstone which corresponded precisely with the New Red Sandstone at Newtownards in County Down.

We have now rapidly traversed the coastal deposits of drift with a glance at a bed of clay a little inland. It remains to follow the drift of the valleys to the high-level developments on the Three Rock Mountain and elsewhere, but before doing so let us ascend the Great Sugar-Loaf. Starting from the top of the Glen of the Downs we note the presence of granite boulders lying on the side of the mountain between the level of 1,000 and 1,100 feet. These, it is needless to say, are erratics, as the Great Sugar-Loaf is of Cambrian quartzite. At about 1,100 feet the talus of the quartzite cone forming the summit begins, so that if any granite boulders ever reached a higher level they would most likely get covered up by the talus material. On the descent to the north-eastward the talus reaches a lower level, and at 880 feet above the sea a granite boulder was observed amongst it. Also at 550 feet one 3 feet in diameter occurred, while still lower down a much larger one almost entirely embedded in the ground was to be seen.

On the main road from the Glen of the Downs to Bray some very interesting gravel pits in esker-like mounds are to be seen, consisting largely of limestone gravel and boulders intermixed with granite. Shell fragments were found in all of them, but mostly in a very chalky and carious condition, in some cases being a mere net-work. They are mostly indeterminable excepting *Turritella* and *Cardium*. These mounds show oblique bedding of sand and gravel, in one case capped with boulder-clay. Some of the fine gravel is so clean that it runs like shot on being disturbed. We will now turn our attention to the valleys, and first of all that of Glennasmole enlists our sympathies, due to some extent to the splendid conditions of weather under which it was explored. Again we were indebted to Mr. Close's guidance and to Mr. Praeger's help.

A drive by the banks of the River Dodder showed a fine series of river terraces formed out of the glacial drift. At a

level of about 860 feet above the sea a very careful search in a large gravel-pit yielded a few glacial shell fragments of the ordinary type, but indeterminable; most were chalky and carious. A microscopic examination after riddling disclosed the presence of a few shelly grains as also much granitic debris. There is a great development of drift in this valley which is best seen from the opposite side near the reservoir of the Rathmines Waterworks. It is buff-coloured, clayey, to the greatest extent limestone, but also containing granite, Ordovician grit, and felstone. Some of the limestone pebbles are striated. It is quite remarkable how this limestone gravel has been swept up the valley and rests on the granite forming the bottom rock. The drive back on the opposite side of the valley—after a pleasant lunch in a sunny hayfield and admiring glances at Kippure rising majestically at the head of Glennasmole—showed plainly that, though the drift is still in great force, much of it has been removed by denudation.

We may now with advantage devote a little attention to Glencullen. This valley drains to the south-east, or in the opposite direction to that of the upper part of Glennasmole. In it is to be seen a grand development of drift, which has already been described in this Journal by Professor Grenville Cole, who accompanies his observations with a good photograph.[1] This drift is of a very stony nature, so much so that I had to get a specimen I wanted out with a chisel. It is mostly full of Carboniferous limestone pebbles of a dark blue colour; some well worn, and many well striated—some of the boulders intensely so. There is also a considerable proportion of Wicklow granite, some mica schist, and many flakes of mica; also boulders of red conglomerate from the base of the Carboniferous. The granite increases in proportional quantity as we ascend the glen, until at Glencullen Bridge it becomes predominant. In many places great blocks of gravel are cemented together into a natural concrete by the deposit of carbonate of lime. Further south, below Enniskerry, stratified yellow sands are seen on the right bank of the Cookstown River, probably 100 feet thick. In these sands are thin beds of crushed granite and occasional thin beds of limestone gravel.

(TO BE CONCLUDED).

[1] "County Dublin, Past and Present." *I. N.*, 1892, p. 92

INSECTS COLLECTED BY THE ROYAL IRISH ACADEMY FLORA AND FAUNA COMMITTEE, 1893.

BY REV. W. F. JOHNSON, M.A., F.E.S., J. N. HALBERT, AND GEORGE H. CARPENTER, B.SC.

COLEOPTERA.

(*Continued from page* 105.)

HYDROPHILIDÆ.

Hydrobius fuscipes, L.—Coolmore.

Anacæna globulus, Payk.—Lough Oughter, in drains. Slieve Glah, in a pool.

Philhydrus melanocephalus, Ol.—In a pool on Slieve Glah.

P. coarctatus, Gredt.—Coolmore.

Laccobius minutus, L.—Coolmore.

Limnebius truncatellus, Thoms.—Coolmore.

Helophorus nubilus, F.—Coolmore.

H. aquaticus, L.—Berehaven.

H. brevipalpis, Bedel.—Coolmore. Slieve Glah, in a pool.

Cyclonotum orbiculare, F.—Coolmore.

Sphæridium scarabæoides, F.—Coolmore. Ballyhaise.

Cercyon littoralis, Gyll.—Coolmore. Greenore.

C. hæmorrhoidalis, Herbst.—Coolmore. Carlingford.

C. flavipes, F.—Coolmore.

C. melanocephalus, L.—Coolmore.

C. quisquilius, L.—Coolmore.

C. analis, Payk.—Coolmore.

Megasternum boletophagum, Marsh.—Coolmore.

STAPHYLINIDÆ.

***Aleochara lata**, Grav.—Coolmore, in dead bird. This is a southern species in England; its occurrence in Co. Donegal is therefore remarkable.

A. cuniculorum, Kr.—Coolmore.

A. lanuginosa, Grav.—Coolmore.

A. mœsta, Grav.—Coolmore.

A. grisea, Kr.—Coolmore.

Oxypoda opaca, Grav.—Coolmore.

Astilbus canaliculatus, F.—Coolmore.

Homalota vicina, Steph.—Coolmore.

H. atramentaria, Gyll.—Coolmore.

***H. longicornis**, Grav.—Coolmore.

Tachyusa atra, Grav.—Coolmore.

Conosoma lividum, Er.—Near Cavan, common.

Tachyporus obtusus, L.—Ballyhaise.

var. **nitidicollis**, Step.—Cavan, very common.

T. chrysomelinus, L.—Coolmore. Dundalk. Cavan.

T. humerosus, Er.—Cavan.

***T. tersus**, Er.—Ballyhaise.

T. hypnorum, F.—Coolmore. Cavan.

Tachinus rufipes, L.—Coolmore. Fathom.

T. marginellus, F.—Ballyhaise.

Quedius mesomelinus, Marsh.—Oak Wood, Ballyhaise. It has occurred as yet in only two other localities in Ireland, viz.—Armagh and Santry, Co. Dublin.

Q. cinctus, Payk.—Shores of Lough Oughter.

Q. fulginosus, Grav.—Fathom. Cavan, common. Killarney.

Q. tristis, Grav.—Coolmore.

Q. molochinus, Grav.—Coolmore. Slieve Glah, under stones on the summit.

Q. rufipes, Grav.—Coolmore.

Q. semiæneus, Steph.—Coolmore.

Creophilus maxillosus, L. var. **ciliaris,** Steph. { Coolmore, both type and variety were very plentiful in carrion. The var. seems to be regarded as a northern form, although taken by Haliday, near Dingle.[1]

Staphylinus pubescens, De G.—Coolmore.

S. erythropterus, L.—Coolmore.

S. cæsareus, Ceder.—Coolmore. Shores of Lough Oughter, under logs. Dursey. It does not appear to have been previously recorded from the south-west, which is remarkable seeing it is so conspicuous and common an insect.

Ocypus olens, Müll.—Coolmore. Fathom, Shores of Lough Oughter.

O. cupreus, Rossi—Coolmore. Ballyhaise.

O. morio, Grav.—Coolmore.

Philonthus splendens, F.—Coolmore, in carrion.

P. laminatus, Creutz.—Coolmore.

P. æneus, Rossi—Coolmore.

P. proximus, Kr.—Coolmore.

P. addendus, Sharp.—Coolmore. Ballyhaise.

P. carbonarius, Gyll.—Oak wood, Ballyhaise.

P. politus, F.—Coolmore.

***P. lucens,** Er.—One specimen on shore of Lough Oughter. A rare species in Great Britain (where it has a northern and western range), and a nice addition to the Irish fauna.[2]

P. varius, Gyll.—Ballyhaise. Dursey.

P. marginatus, F.—Coolmore.

P. cephalotes, Grav.—Coolmore.

P. fimetarius, Grav.—Coolmore. Ballyhaise.

P. sanguinolentus, Grav.—Coolmore. Ballyhaise.

P. varians, Payk.—Coolmore.

***P. fumarius,** Grav.—Lough Oughter shore. New to Ireland. Locally distributed over England and Wales, but not recorded from Scotland.

P. trossulus, Nord.—Coolmore. Cavan, common.

P. puella, Nord.—Oak Wood, Ballyhaise.

Cafius xantholoma, Grav.—Beach at Greenore.

---

[1] We find that *Carabus catenulatus* and *C. clathratus* given in last month's issue as new to the S. W. of Ireland, were also obtained near Dingle by Haliday (*Nat. Hist. Rev.* vol. ii.)—*Eds.*

[2] It will be seen on p. 134, that Mr. W. E. Sharp has found this species in flood-rubbish from Armagh.—*Eds.*

Xantholinus glabratus, Grav.—Coolmore.

X. punctulatus, Payk.—Cavan, common.

X. tricolor, F.—Coolmore; hitherto only recorded from the east coast.

* **X. distans**, Kr.—Coolmore. Banks of R. Erne above Ballyshannon. It has also occurred at Bundoran. It is a northern and alpine insect.

X. linearis, Ol.—Coolmore. Cavan, common.

Othius fulvipennis, F.—Ballyhaise, Oak wood.

O. melanocephalus, Grav.—Ballyhaise, Oak wood.

Lathrobium elongatum, L.—Shores of Lough Oughter.

L. brunnipes, F.—Coolmore. Cavan, common. Killarney.

* **L. pallidum**, Nord.—Coolmore. Another south of England species now recorded as Irish for the first time, from a north-western locality.

Stenus guttula, Mull.—Coolmore, plentiful on edges of little streams.

S. bimaculatus, Gyll.—Farnham demesne.

S. juno, F.—Farnham demesne.

S. carbonarius, Gyll.—Shores of Lough Oughter; only other Irish locality is Killarney.

S. impressus, Germ.—Carlingford. Cavan.

S. pallitarsis, Steph.—Cultragh Lough.

S. bifoveolatus, Gyll.—Near Cavan.

S. nitidiusculus, Steph.—Cavan, common.

S. picipes, Steph.—Ballyhaise, &c., common.

S. similis, Herbst.—Cavan, common. Coolmore.

S. tarsalis, Ljun.—Lough Oughter shore.

S. latifrons, Er.—Coolmore. Cavan.

Bledius arenarius, Payk.—Coolmore, very numerous in the sandy beach.

* **B. fuscipes**, Rye.—Coolmore, rare. New to Ireland; a northern insect in Great Britain.

Platystethus arenarius, Fourc.—Coolmore. Cavan, common.

Oxytelus rugosus, Grav.—Coolmore.

O. nitidulus, Grav.—Cultragh Lough.

O. tetracarinatus, Block.—Coolmore, plentiful.

Haploderus cœlatus, Grav.—Near Cavan.

Lesteva longelytrata, Goeze.—Coolmore.

Lathrimœum unicolor, Steph.—Cavan, common.

Omalium riparium, Thoms.—Coolmore.

Anthobium ophthalmicum, Payk.—Narrow Water.

(TO BE CONTINUED.)

POTAMOGETON UNDULATUS, WOLFGANG, IN IRELAND.

BY ARTHUR BENNETT, F.L.S.

RECENTLY I have gone through a good many gatherings of *Potamogeton perfoliatus*, L., &c., with a view to see if any could be referred to *P. undulatus*, Wolfgang; attention to which has been called by Mr. Fryer in the *Journal of Botany* for 1891 (p. 289, t. 318), and in the *Annals of Scottish Natural*

History, 1892 (p. 115). I find that a specimen from "Sixmile River, Co. Antrim, 5. 6. 82 (leg.) S. A. Stewart," belongs to it, and seems nearest to the var. *Jacksoni*, Fryer *l.c.* p. 290 (*P. perfoliatus*, L., var. *Jacksoni*, F. A. Lees of the London Catalogue). Whether any other Irish specimens are extant I cannot say, as I have not had any opportunity of looking through the British Museum Herbarium or Kew Herbarium for that purpose.

In Scotland *P. undulatus* has been gathered in Stirling!; in England in Leicestershire!, Yorkshire!, Cheshire!, Salop!, Anglesea!, and perhaps Surrey?; and it will no doubt be found elsewhere if looked for, or searched for among herbaria. For a very full description, and remarks on affinities, I must refer to Mr. Fryer's paper in the *Journal of Botany*.

What is *P. undulatus*, Wolfgang? It may be well to give some of the opinions respecting it. Where originally described in Roemer and Schultes' "Sys. Veg.," Mantissa 3, p. 361 (1827), it was considered a sub-species or variety of *P. crispus*. Ledebour ("Flora Rossica," vol. iv. p. 29 (1853)), seemed to think the same; as also Eichwald (Nat. Shizz. Lith., &c. (1830)); and as lately as 1890 it appears in Dr. Richter's "Plantæ Europœæ" (p. 14), simply as a synonym of *P. crispus*. In the same year, in Nyman's "Conspectus Floræ Europœæ," Suppl. ii., p. 287, it is referred to *P. decipiens* on the authority of Schmalhausen. Dr. Tiselius (*in litt.*) was inclined to refer it to *P. prælongus;* and by myself the var. *Jacksoni* was considered a form of *perfoliatus*, while Prof. Babington thought it might be a *nitens* form. This is a sufficiently wide reference for certain, taking all the above. Mr. Fryer, by cultivating the form *Cooperi*, and by a close and careful observance of its various states, coupled with an examination of an original specimen of Wolfgang's, came to the conclusion that it is an hybrid between *P. crispus* L., and *P. perfoliatus* L., and short of producing it by actual experiment, it seems hard to dispute his conclusion.

The author of the plant, Wolfgang, was a close student of the genus *Potamogeton*, and drew up a Monograph of it in MS. with descriptions and drawings, and it is to that Monograph that the numbers given to Roemer and Schultes by his friend Besser apply. This manuscript is preserved in the Library of the Moscow Society of Naturalists, according to Trautvetter ("Florae Rossicae Fontes," p. 329 (1880)).

P. undulatus may be known from *P. perfoliatus* by its compressed stem; this is easily seen when the plant is fresh, but is lost when dried; also by its leaves only half clasping the stem (not wholly, and cordate, as in *perfoliatus*). Usually the nerves are much fewer than in *perfoliatus;* the early growth is also much like *crispus* in facies; but as in all hybrids, it varies much, sometimes inclining to one supposed parent, sometimes to the other. From *P. crispus* it may be known by the nearly entire leaves (the apex of which has minute persistent spines) not serrated as in *crispus.* Usually the mature upper leaves are much broader than generally is the case in *crispus;* but I have seen a specimen of true *crispus* with leaves nearly as broad as some of the *undulatus* forms.

AMERICAN BIRD-VISITORS TO IRELAND.

BY W. E. PRAEGER, KEOKUK, IOWA.

VII.—The White Jer-Falcon (*Falco islandus*, A.O.U. Check-list; *F. candicans*, most authors).

A glance over what has been written on the Jer-Falcon in our systematic works, will convince the reader that in ornithology also the old saying is true, "Doctors differ." No two authorities are quite agreed as to how many species of the great falcon of the Arctic regions ought to be recognised. The Jer-Falcons from various countries differ greatly from each other, yet for the most part they intergrade perfectly; and the discussions of the savants, after all, only prove that such things as species do not really exist in nature, but are artificial groups, adopted for our own convenience, or in deference to the opinion of our predecessors.

The Jer-Falcons inhabit the Arctic and Sub-Arctic regions. They are true Falcons, possessing the pointed wing and toothed bill of this genus, of which they are the largest representatives. A length of from 20 to 24 inches distinguishes them from all their smaller allies. As is often the case in Arctic birds, the tarsus is more extensively feathered than among the more southerly species of the same genus. There should be no trouble telling a Jer-Falcon at sight irrespective of its colour; but when we come to that characteristic, on which the various species or sub-species are based, the question becomes very complicated, and need not be entered on in any detail here. It will be sufficient to say that in Labrador

occurs the so-called "Black" Jer-Falcon, of a nearly uniform dark brown. Around Baffin's Bay the bird is nearly pure white, while in Southern Alaska, the Fur Countries, Southern Greenland, Iceland, and Norway, various forms occur between these two extremes.

The White Jer-Falcon, with which we are now concerned, has occurred ten or twelve times in Ireland, eight having been taken in the winter of 1883–4. They have usually been found along the west coast, which in winter almost rivals their distant home in stormy desolation and rugged grandeur.

We call this an American bird, yet very few Americans have ever seen it alive; indeed, I do not know if it has ever been noticed in the United States. Its centre of distribution is the northern shores of Baffin's Bay and Smith's Sound, and it probably occurs throughout the archipelago to the westward. As far north as man has penetrated this Falcon has been found. In that mysterious land of ice and snow, that has so long defied the explorer's skill and courage, and has as yet given up but a part of its secrets to the so-called lord of creation, the White Jer-Falcon has its home. Among the eternal snows in which it lives, its white dress is highly protective—not to protect it from enemies, for such a bird need fear none, but, as in the case of the bears, foxes, and owls of the same region, to aid it in the pursuit of its prey. The bleak hillsides furnish it many a meal of Ptarmigan or Arctic Hare, the cliffs are visited in pursuit of the Auks and Puffins that breed there in myriads, and even the tyrant Gulls are not safe from its attacks. One has been seen carrying off a Kittiwake Gull in each foot.

As the White Jer-Falcon lives above the limits of the forest-growth, it always nests on the ground, though some of the more southern races build in trees. The nest is roughly built of sticks, grass, and moss, and is placed most frequently on a ledge of some high cliff. The eggs are creamy white, very thickly marked with shades of reddish brown.

In the days of falconry the white bird was the most highly valued of all hawks for the chase, and fabulous sums were paid for trained birds of this species; indeed, their possession was almost confined to royalty. But this most interesting subject cannot be entered on here, and we must leave the reader to pursue elsewhere his studies of this fascinating chapter in the history of the White Jer-Falcon.

THE PLANTS OF WESTMEATH.

BY H. C. LEVINGE, D.L.

(*Concluded from page* 100).

‡**Verbascum thapsus,** L.—Knock Drin, several times seen in garden ground.

Scrophularia aquatica, L.—(VII.) Clondaliever, rare in the county.

Linaria vulgaris, Mill.—Fields near L. Sheelin, Miss E. Reynell.

Veronica hederifolia, L.—Knock Drin! Shore of Killinure Lough, B. & V.

‡**V. persica,** Poir.—Knock Drin, not previously definitely reported from the county; but placed in District 7 by B. & V.

V. montana, L.—Knock Drin old wood! Donore! also at Hare Island, L. Ree, B. & V.

V. scutellata, L.—Drinmore, not common in the county.

Euphrasia officinalis, L. var. **gracilis,** Fr.—Bog banks at entrance of R. Inny into L. Derevaragh, H. & J. Groves!

Melampyrum pratense, L.—Knock Eyon and Lisclogher Bog.

Lathræa squamaria, L.—Belvedere Woods, not previously recorded from the county.

Utricularia vulgaris, L.—Quarry Bog, and Scraw bog, Loughanstown.

U. minor, L.—Quarry Bog! and Coosan Lough, B. & V

***Mentha viridis,** L.—(VII.) Naturalized at edge of R. Gaine, below the old mill at Knock Drin.

Lycopus europœus, L.—Shore of L. Derevaragh at Kiltoom, rare! not previously definitely recorded from this county; but found in District 7, near L. Ree, B. & V.

Origanum vulgare, L.—Railway banks between Athlone and Moate, Reynella, Miss E. Reynell.

Scutellaria galericulata, L.—N.W. end of L. Owel, locally plentiful.

Lamium album, L.—Knock Drin.

L. Galeobdolon, Crantz—Woods at L. Ennel, near Mullingar F. J. F. Not seen by me, though several times searched for.

Ballota nigra, L.—Near Turin, Miss E. Reynell.

Teucrium Scordium, L.—South end of L. Ree, J. & H. Groves, also B. & V.

Littorella lacustris, L.—Margins of Loughs Owel, Ennel, Derevaragh, and Drin! also L. Ree, B. & V.

Chenopodium album, L.—Knock Drin; not previously recorded from the county.

***C. Bonus-Henricus,** L.—Roadside, between Ballinafid and Multifarnham.

Atriplex angustifolia, Sm.—Knock Drin; not previously recorded from the county.

Rumex hydrolapathum, Huds.—N.W. end of L. Owel. Not previously definitely recorded from the county; but placed in District 7 by B. & V., who found it near L. Ree.

Parietaria officinalis, L.—Walls of Mullingar Jail.

Salix pentandra, L.—(VII.) Bog of Lynn, near Mullingar, in several places.

†**S. fragilis,** L.—(VII.) Quarry Bog, near road.

†**S. alba,** L.—(VII.) Knock Drin.

†**S. purpurea,** L.—(VII.) Knock Drin.

S. aurita, L.— } Knock Drin; not previously definitely recorded
S. caprea, L.— } from the county.

S. repens, L. var. **genuina,** Auct.—(VII.) Lisclogher Bog.
var. **prostrata,** Sm.—(VII.) Scraw Bog, Loughanstown.

Empetrum nigrum, L.—Lisclogher Bog, 270 feet above sea level, not previously recorded from the county. The plant is locally plentiful on this flat bog—Mr. Dowd reports it from "the tops of mountains four miles from Parsonstown," King's County (District 7.)

Ceratophyllum demersum, L.—(VII.) L. Derevaragh, plentiful in the part of the lake known as "the pond of Donore," but not fruiting, probably owing to the water being too deep where it grows.

***Elodea canadensis,** Mich.—L. Ennel, L. Derevaragh, &c.

Hydrocharis Morsus-Ranæ, L. — Bog of Lynn, "Scraw bog," Ballynegall, and road ditch, Robinstown Levinge.

Neottia Nidus-avis, Rich.—Knock Drin woods in two places; not previously reported from the County Westmeath.

Epipactis latifolia, Auct.—Hare Island, L. Ree, B. & V.

E. palustris, Crantz.—One or two places round Killinure L., and abundant in meadows near L. Ree, B. & V.

Cephalanthera ensifolia, Rich.—Hare Island, L. Ree, Miss Levinge, also B. & V.

Orchis pyramidalis, L.—Knock Drin, plentiful.

O. Morio, L.—Kilmaglish and Knock Eyon, in old pastures.

O. latifolia, L.—Shore of L. Derevaragh.

Ophrys apifera, Huds.—Tudenham Park, Hon. Mrs. Tottenham! and Knock Drin! rare.

Habenaria conopsea, Benth.—Knock Drin and Ballynegall.

H. viridis, R. Br.—Bog of Lynn and "Scraw Bog," Loughanstown—rare.

H. bifolia, R. Br.—Bog of Lynn.

H. chloroleuca, Ridley—Curraghbrack, Knock Drin! and E. side of Rinardo Bay, L. Ree, B. & V.

***Polygonatum multiflorum,** All.—(VII.) Donore—naturalized and well established.

Juncus supinus, Mœnch., var. **fluitans,** Fr.—Quarry bog, in holes; leaves wider than in the mountain form.

J. glaucus, Ehrh.—Plentiful about Knock Drin! not previously definitely recorded from this county, but said to be common near L. Ree by B. & V., who have referred it to District 7.

Juncus obtusiflorus, Ehrh.—(VII.) Scraw bog, Loughanstown, Robinstown, Tyrrell, and near the bank of the canal supply at Levington.

Luzula pilosa, Wittd.—(VII.) Knock Drin wood, Donore, and Crooked wood.

Sparganium simplex, Huds. — Gartlandstown! and in the Shannon near Athlone, B. & V.

S. minimum, Fr.—Quarry Bog! and near Coosan L., B. & V.

Lemna trisulca, L.—Kilmaglish! "Scraw bog"! and near Doonis Lough, B. & V.

L. polyrrhiza, L.—Pond at roadside, near Portnashangan Rectory! Belvedere L., D. M., and in a drain near Doonis L., B. & V.; not common.

Sagittaria sagittifolia, L.—L. Derevaragh, and River Inny; plentiful.

Potamogeton plantagineus, De Croz.—In holes, "Scraw Bog" Loughanstown.

P. rufescens, Schrad.—In a drain, near Ballykeeran, B. & V.

P. heterophyllus, Schreb.—L. Owel; not previously definitely reported from Co. Westmeath, but referred to Dist. 7 by B. & V., who state that it is common near L. Ree.

P. nitens, Web.—(VII.) L. Derevaragh.

P. lucens, L.—L. Derevaragh, L. Owel, and L. Ennel.

var. **acuminatus**, Schum.—L. Derevaragh, near mouth of R. Inny.

P. Zizii, Roth.—L. Drin! L. Derevaragh! and plentiful in L. Ree, B & V.

P. prælongus, Wulf.—(VII.) L. Owel.

P. perfoliatus, L.—Brittas L.! Knock Drin! and L. Derevaragh, and common in L. Ree, B. & V.

P. pusillus, L.—Stream from L. Drin! and frequent in drains near L. Ree, B. & V.

P. pectinatus, L.—L. Ennel, and Ballynegall Lakes.

P. flabellatus, Bal.—In the Shannon, near Athlone, B. & V.

P. filiformis, Nolte.—Frequent in L. Ree, B. & V.

Scirpus pauciflorus, Lightf.—Shores of L. Drin, and of L. Ennel! and common in L. Ree, B. & V.

S. lacustris, L.—In nearly all the lakes; plentiful; but not previously reported from the Co. Westmeath.

S. setaceus, L.—(VII.) Knock Drin; not common.

Cladium germanicum, Schrad.—Plentiful on the margin of L. Drin! L. Owel, &c., and L. Ree, B. & V.

Carex dioica, L.—Lisclogher Bog, "Scraw bog," Loughanstown.

C. pulicaris, L.—Drinmore, and elsewhere, plentiful! also common in the neighbourhood of L. Ree, B. & V.; but not previously definitely reported from Co. Westmeath.

C. disticha, Huds.—Quarry Bog, and edge of L. Derevaragh at Kiltoom! also banks of the Inny in Co. Longford, B. & V., but not previously definitely reported from the Co. Westmeath.

C. teretiuscula, Good.—"Scraw Bog," Loughanstown, and Bog of Lynn; frequent.

C. paradoxa, Willd.—Ladestown, only a few plants left in the old locality. I have however lately found it in the bog of Lynn, and sparingly in the "Scraw bog," Loughanstown.

C. remota, L.—(VII.) Knock Drin; not a common plant.

C. ovalis, Good.—Knock Drin, and Drinmore! and frequently near L. Ree, B. & V.; but not previously definitely reported from Westmeath.

C. stricta, Good.—Quarry bog, and elsewhere.

C. limosa, L.—Lisclogher Bog, and Scraw bog, Loughanstown.

C. pilulifera, L.—Edge of L. Drin! Shefin Hill, Miss Levinge, and "frequent in suitable places" near L. Ree, B. & V, but not before definitely reported from Westmeath.

C. binervis, Sm.—Edge of L. Drin, not common.

C. fulva, Good., var. **Hornschuchiana,** Hoppe.—Knock Drin and Drinmore, not uncommon.

C. Œderi, Ehrh.—(VII.) Shores of L. Ennel.

C. filiformis, L.—"Scraw bog," Loughanstown, very plentiful locally.

C. paludosa, Good.—Shores of L. Derevaragh, and Quarry Bog.

C. vesicaria, L.—Near Athlone, B. & V.

Phalaris arundinacea, L.—Knock Drin, abundant! not previously definitely reported from the county, though mentioned as common near L. Ree by B. & V.

Alopecurus geniculatus, L.—
A. pratensis, L.—
} Kilmaglish! Drinmore! Both are reported as common near L. Ree; but neither have been before definitely recorded from the Co. Westmeath.

Milium effusum, L.—(VII.) Knock Ross with *Festuca sylvatica,* rare.

Phleum pratense, L.—Knock Drin, and generally plentiful; but not before recorded from the county.

Deschampsia flexuosa, Trin.—(VII.) Quarry, Knock Drin.

Holcus mollis, L.—Woods and edge of Brittas L., Knock Drin! not uncommon near L. Ree, B. & V.; not definitely reported before from this county.

Trisetum flavescens, Beauv.—Knock Drin—same remarks as above.

Avena pubescens, Huds.—Plentiful; but not noted in the *Cyb. Hyb.* as from this county.

***A. strigosa,** Schreb.—(VII.) Knock Drin, in cultivated fields.

Arrhenatherum avenaceum, Beauv., and var. **nodosum,** Reichb.—Knock Drin. The variety is perhaps the more common of the two.

Sieglingia decumbens, Bernh.—Drinmore, not common.

Catabrosa aquatica, Beauv.—Drinmore, in ditches! frequent near L. Ree, B. & V., but not before definitely reported from Westmeath.

Melica uniflora, Retz.—Knock Ross and Knock Eyon, locally plentiful; not previously reported from this county.

Poa nemoralis, L.—(VII.) Tops of old walls at Knock Drin, thoroughly established, if not indigenous.

Glyceria aquatica, Sm.—Canal at Mullingar.

Festuca rigida, Kunth.—(VII.) Killynon, Edmonton, and near Mullingar.

F. sciuroides, Roth.—Knock Ross and Knock Drin; not before reported from Westmeath.

F. sylvatica, Vill.—(VII.) Knock Ross, rare.

F. arundinacea, Schreb.—Knock Drin, not before reported from Westmeath.

F. elatior, L. var. **loliacea,** Huds.—Knock Ross. In this locality I found two forms—awned and unawned—which were submitted to the Watson Botanical Exchange Club. Both are alluded to in the report for 1892-93; the awned form is there called "forma *aristata*" on Hackel's authority—fide A. Bennett.

†**Bromus erectus,** Huds.—(VII.) Knock Drin, in meadows, probably introduced with grass seed.

B. sterilis, L.—Athlone, Miss Levinge. B. & V. refer this to Dist. 7 in their paper on the plants of the shores of L. Ree, but do not state from what county it was obtained.

Bromus racemosus, L.—(VII.) Knock Drin.

‡ **Lolium temulentum,** L.—Knock Drin.

Agropyron caninum, Beauv.—(VII.) Knock Ross, near the edge of the lake.

‡ **Hordeum pratense,** Huds.—(VII.) Knock Drin, only one large plant found.

Asplenium Adiantum-nigrum, L.—Knock Ross and Knock Eyon.

Ceterach officinarum, Willd.—Walls of Poorhouse, near Mullingar.

Scolopendrium vulgare, L., var.—Knock Drin, sori on the upper and lower surfaces with anastomosing veins once found.

Cystopteris fragilis, Bernh.—On walls at Sonna, near Ballymore, F. J. F.

Lastrea Thelypteris, Presl.
L. spinulosa, Presl. } Quarry and Lisclogher Bogs.

L. æmula, Brack.—Knock Body, growing very luxuriantly in the woods at the top of the hill above the lake.

Polypodium vulgare, L., var. **serratum,** Willd.—(VII.) Knock Ross.

Osmunda regalis, L.—Robinstown—Levinge, and Quarry Bogs.

Ophioglossum vulgatum, L.—Knock Drin, in meadows and pastures.

Botrychium Lunaria, Sw.—Knock Eyon, Miss E. Reynell, Shefin Hill, Miss Levinge.

Equisetum palustre, L.—Drinmore! and common near L. Ree; not before definitely reported from this county.

E. variegatum, Schleich, var. **Wilsoni** Newm.—Edge of L. Drin, and banks of canal near Killucan. Mr. A. Bennett remarks in the report of the Watson Exch. Club for 1892-3, regarding this plant, "The specimens have the stems not above half the thickness of the Killarney plants (*Wilsoni*), and are altogether a much slenderer plant. I should have named them *E. variegatum*, var. *majus*, Syme., that is, the same as the Royal Canal plant at Dublin.

Selaginella selaginoides, Gray.—Edge of L. Drin.

Chara fragilis, Desv.—Scraw bog, Loughanstown, and in all the lakes.

var. **barbata,** Grant—Scraw bog, Loughanstown, rare.

C. aspera, Willd.—Brittas L., Knock Drin, several forms.

C. polyacantha, A. Br.—Holes in Scraw bog, Loughanstown.

C. contraria, Kuetz.—Brittas L., and L. Owel, several forms, plentiful.

Chara tomentosa, L.—Plentiful, and growing to a very large size in Loughs Owel and Derevaragh; smaller in L. Ennel.

var.—In a drain N.W. corner of L. Owel, a well marked, but undescribed variety, less branched than the type, found by Mr. Groves!

C. hispida, L., var. **rudis,** A. Br.—L. Drin and Brittas L., locally common.

C. vulgaris, L.—L. Ennel, several forms.

Tolypella glomerata, Leonh.—L. Derevaragh, in the boat harbour, Kiltoom, and in the part of the lake known as the "Pond of Donore."

Nitella tenuissima, Kuetz.—Holes in the Scraw bog, Loughanstown. Found in this locality—for the first time in Ireland—by Mr. H. Groves!

N. opaca, Agardh.—L. Derevaragh (Pond of Donore), and Brittas L.

FEBRUARY COLEOPTERA FROM ARMAGH.

BY W. E. SHARP.

Of all the votaries of practical Biology it is probable that the Coleopterist feels least the limitations of locality and season. There is indeed not a day in the circle of the year, except during hard frost or deep snow, not a square foot from mountain top to lake bottom which may not afford him spoil or sport. There are coleoptera to be found in London bake-houses and beneath high-water mark on our shores, they exist everywhere and they are always in season. Any random handful of moss or haystack refuse, or vegetable litter, may provide the student, especially the beginner, with material for the work of weeks. How many species would the Lepidopterist or the Hymenopterist be likely to discover of their favourite groups alive and unimpaired in a tangled bunch of decayed herbage sent in a bag half across a kingdom?

Yet the writer, when our rural Cheshire postman delivered with evident relief a stout canvas bag, bearing the post-mark of Armagh, heavy with wet moss and indeed itself dripping with water, knew that in this unpleasantly moist parcel myriads of interesting, and probably some, to him, new Coleoptera were lurking, and rejoiced in the prospect of the beetles of an acre comprehended in a bushel. The time was immediately after a day or two's heavy February rain, the origin of the parcel the kindness of the Rev. W. F. Johnson of Armagh, who had gone to the trouble of collecting a quantity of the indefinite refuse which collects after a flood in a locality near that town, known as the Mullinures.

In an article on Armagh Coleoptera (*Irish Naturalist*, vol. 1., p. 15), the Rev. W. Johnson has already explained the nature of this ground, and given a list of some of its beetle inhabitants. It has however occurred to me that it might be interesting if I were to very shortly enumerate the actual species which were found in this mass of not more than seven or eight pounds of "flood refuse." My method of capture was to shake out the litter (in a common garden sieve, a few handfuls at a time), over a large white dish with steep sides. A moistened finger-tip transferred the beetles to a laurel bottle and their doom.

The appearance of this dish on the shaking out of one of these handfuls was comparable to an ants' nest when one removes the stone beneath which it is constructed. The "staphs" were most numerously represented, *Homalotæ* and *Steni* absolutely swarmed, but a species of *Bembidium, B. Mannerheimii,* ran them very close.

To begin in order at the beginning with the GEODEPHAGA. There were two *Notiophili, N. palustris* and *N. biguttatus, Pterostichus strenuus,* and *P. nigrita, Anchomenus gracilis,* and *A. puellus,* the *Bembidia, B. Clarki, B. doris, B. obtusum,* and *B. Mannerheimii.* Of these there were only about three *B. doris,* but *B. Mannerheimii* absolutely swarmed. There was also *Dyschirius globosus* and *Dromius melanocephalus.* In a previous bag from the same spot I took *Agabus unguicularis,* but on this occasion I discovered no Hydradephaga.

Among the PALPICORNIA *Limnebius truncatellus, Helephorus aquaticus,* and *H. æneipennis, Ochthebius bicolon, Cercyon melanocephalus, C. analis, C. flavipes,* and of course *Megasternum bolitophagum* occurred.

Among the CLAVICORNIA the *Pselaphidæ* were well represented. *Tychus niger* was very common, there was also *Bythinus puncticollis, Bryaxis fossulata,* and *B. juncorum,* and the minute and unsettable *Euplectus ambiguus.* Then *Scydmœus collaris* was plentiful, and one specimen of *Clambus armadillo* turned up. One specimen of *Meligethes viridescens,* a few *Cryptophagus scanicus,* two or three common *Coccinellæ,* and, exceedingly commonly, *Coccidula rufa.*

These concluded the Clavicornia if we treat STAPHYLINIDÆ separately. These latter formed by far the majority of the catch. The *Homalotæ* were (as far as I could identify them), *H. analis, H. circellaris, H. debilis, H. graminicola* (in myriads), *H. triangulum, H. hygroptera,* and of course *H. fungi.* Very common was *Oxypoda opaca,* there were two species of *Aleochara, A. languinosa* and *mœsta. Astilbus canaliculata* was very common, and I was very pleased to identify the handsome *Myrmedonia collaris,* to me a new species. *Tachyporus humerosus* was abundant, more so than the three other species of this genus present, *T. chrysomelinus, T. hypnorum,* and *T. brunneus.* There was *Tachinus rufipes* in plenty, *Mycetoporus nanus,* a couple. Then came *Quedius semiæneus* very numerous, *Q. rufipes,* a single specimen, *Q. tristis* also was conspicuous. The *Philonthi* were well represented. I took two specimens of *Philonthus lucens* in a bag of refuse from the same locality last year, and this, I fancy, forms the only Irish record of this rare species[1]. I could however find none in the parcel under investigation now. But there were *Philonthus laminatus, P. politus, P. varius, P. æneus, P. nigrita, P. puella,* and more abundantly almost than any other species, *P. trossulus.* There was *Ocypus cupreus, Lathrobium brunnipes,* and (another species new to me) *Lathrobrium quadratum, Oxytelus rugosus,* and *O. tetracarinatus, Platystethus arenarius, Trogophlœus elongatus, T. corticinus,* and *Evæstethus ruficapillus.* The *Steni* were also very much in evidence, and the following species occurred ;—*Stenus juno, S. æmulus, S. speculator, S. declaratus, S. unicolor, S. binotatus, S. pallitarsis, S. bifoveolatus, S. rusticus, S. tempestivus, S. flavipes* (very abundant), *S. similis, S. tarsalis,* and *S. latifrons.* There were also *Lesteva punctata* and *Homalium fossulatum.*

The Lamellicornia, Serricornia and Longicornia were groups unrepresented, but the following PHYTOPHAGA were more or less numerous ;—*Chrysomela staphylea, Phædon tumidulum, Hydrothassa marginella, Longitarsus melanocephalus, L. picipes, L. brunneus,* and *Cassida flaveola.*

---

[1] It will be seen from p. 123, of the present issue, that Mr. J. N. Halbert has taken this beetle in Co. Cavan.—*Eds.*

Among the RHYNCHOPHORA *Apions* were very numerous. *A. fagi* took the lead, but *A. virens* was also plentiful. There were several specimens of *Erirthinus scirpi*, *E. œthiops*, and *Sciaphilus muricatus*, one *Hypera punctata*, and one *Orchestes fagi*. Of the Heteromera I could discover no representative.

Such were the coleopterous captures in this bag of flood drift, at least such as allowed themselves to be captured; for although the mass was well shaken out, it is probable that many individuals refused to drop through the sieve, and so escaped. Nevertheless, we have here some hundred species, without counting certain species of *Trichopteryx*, which evade my attempts at identification. Of course the bulk of the species noted are common enough, but the list, and still more the number of individuals, which were quite beyond computation, manifest how profuse coleopterous life is, show how easily the student of this order may furnish himself with material, and give some slight idea of the beetle fauna of the Armagh district during a mild winter.

I ought not to omit some reference to the shells which abounded in this bag. My friend, Mr. B. Tomlin, of Llandaff, to whom I submitted them, tells me the following species are represented :—

Planorbis contortus, *Succinea elegans*, *Hyalinia alliaria*, *H. fulva*, *Cochlicopa lubrica*, and var. *fusca*.

As to the Mollusca, Myriapoda, Arachnida, and other orders of Insecta besides Coleoptera, these I have no space to enumerate, even if I could name them; but to the urban student of nature on whom the days of winter hang heavy, I can recommend nothing more exhilarating or satisfying, than a bag-full, such as this was, of the floating drift that comes down on the floods of "February fill dyke."

NOTES.

BOTANY.

VASCULAR CRYPTOGAMS.

Equisetum Wilsoni.—The fruiting-time of this plant, as given in the English botanical text-books, and in *Cybele Hibernica*, is July and August. It may therefore be of interest to record the fact that along the Royal Canal last March and April there was a luxuriant growth of this horsetail, with abundance of fruit. Having had the plant under observation for only one year, I cannot say if this is an abnormal occurrence; and whether it will fruit again in July and August remains to be seen.—R. LLOYD PRAEGER.

PHANEROGAMS.

Hieracium cerinthiforme (Backh. in litt.), F. J. Hanbury, in Co. Kerry.—In the *Journal of Botany* (1886, p. 19) Rev. W. R. Linton and myself gave a form of *H. anglicum*, Fr., for Mount Brandon as "being in our judgment the var. *decipiens*, Syme," not speaking more definitely, as Mr. Backhouse spoke doubtfully of our naming. The other day Mr. Hanbury was with me looking over all my *anglicum* forms, and at once called the Brandon plant *H. cerinthiforme*. This justifies the name we gave, as the plant we then called *decipiens*, Syme (? the var. *amplexicaule*, Lond. Cat., 7th edition), has since been raised to specific rank as *H. cerinthiforme* by Mr. Hanbury. As such it has probably not been noticed for Kerry. We were very possibly wrong in stating in the same paper (p. 18) that we found *Alisma natans* in deep water, as well as *A. repens*, Davies, at the margin. It is very likely that the plants out in the lake, without floating leaves, may have been the same with the marginal plant; we thought at the time they were different; but the deep water plant ought to have been grown, if we had then had the means to see which it really was. *A. natans* must not stand for Kerry on our notice of it.—EDWARD F. LINTON.

ZOOLOGY.

MOLLUSCS.

The Common Mussel (Mytilus edulis) in Belfast Lough.—This bivalve has long been abundant in Belfast Lough. Large beds of them existed near low water mark at the edge of the Holywood Banks, and considerable quantities used to be brought into Holywood and used as food. This practice has to a large extent ceased of late. A few years ago a demand for mussels sprang up from Scotland, where they were used as bait in the East Coast fisheries. This Scotch demand in time assumed large dimensions. Several boats' crews were daily engaged during the winter and spring months dredging for mussels, and pulling them up in bunches from the bottom by means of strong iron rakes constructed for the purpose. The mussels were then conveyed to Belfast, in the boats that had taken them, during the latter part of the flood tide, and loaded on board of the Glasgow and Ardrossan steamers, after which the boats would drop down on the ebb tide to resume their work. The undernoted figures will show the dimensions this industry attained to in the year 1889, when over-fishing had its usual result, the following years showing a marked decline, till, in 1892-93, the trade virtually ceased altogether, diminished supplies having made it no longer worth following. Simultaneously with this the dredging of the new channel was going on. This important local work cut right through the point of Holywood Bank, where the principal mussel beds were situated, and virtually destroyed these; but, as since appears, the mussels were not exterminated; they only shifted their quarters; and, this spring, new beds, recruited by the few years rest, were discovered; and, the Scotch demand reviving, these beds proved fruitful and remunerative. Often, during February and March this year, have I seen from 15 to 18 boats engaged in mussel fishing, and an almost similar number, at a different time of the day, putting their takes on board of the Scotch steamers. The extraordinary and sudden development of this trade, after an interval of almost total cessation, will be best seen from the undernoted official figures, for which I am indebted to the courtesy of Mr. W. A. Currie, Secretary to the Belfast Harbour Commissioners. These valuable mussel-beds should be afforded the protection they require to prevent a repetition of the virtual semi-extermination that so lately occurred.

EXPORTS of MUSSELS from the PORT of BELFAST during the months of January, February, and March, in the following years:—

Year.	Tons.
1889,	483
1890,	256
1891,	233
1892,	5
1893,	1
1894,	1,532

—R. LLOYD PATTERSON, Belfast.

BIRDS.

Spring Migrants at Armagh.—The arrivals of these birds vary a good deal this year from last, some being much earlier and others somewhat later. The Chiffchaff and Willow Wren came together on March 24. Swallows were seen by Mrs. Johnson at Loughgall on April 6th, but I did not observe them here till the 10th. The next arrival was the Cuckoo on April 17th, and on the following day I saw the first Swift. The Corncrake was late, for I did not hear it till April 28th. On May 5th, when out in quest of moths in the evening, I heard the Grasshopper Warbler. The latest arrival was the House Martin, which I did not see till May 7th. The Sand Martin I was not able to observe, as I did not visit any of its haunts.—W. F. JOHNSON, Armagh.

Arrival of Spring Migrants in Londonderry District.—Most of our summer visitors reached us this year at their usual date, one was however much before its time while another was much later. I heard the Chiffchaff first on 25th March. On the 3rd April the Sand Martins arrived. The Wheatear appeared at Inch on 9th April. Last year I heard the Willow Wren on 3rd April, while this year I did not hear it until 9th. The Swallows did not reach us till 15th April, a very late date for them. The Corncrake arrived on 24th April, the Cuckoo on 26th April, and the Sedge Warbler on 27th April. Mr. Milne saw a Swift on 29th April, the earliest date I have ever known it to arrive. I did not see it in numbers until 7th May.—D. C. CAMPBELL, Londonderry.

Summer Migrants in the Vale of Ovoca.—I heard the Chiff chaff on April 8th, the Sand Martins arrived on March 28th; the Swallows on April 1st, House Martins on April 3rd, Cuckoo on April 12th, Landrail on April 17th, and Swifts on May 7th.—J. HUNTER, Woodenbridge, Co. Wicklow.

Rare Birds in Achill Island.—In the *Zoologist* for April, Mr. J. R. Sheridan writes that on 12th December, 1892, he saw a male King Eider (*Somateria spectabilis*) near Dugort. Two Surf Scoters (*Œdemia perspicillata*) were seen on 25th October, 1870, and one of them was shot. A third specimen was seen in Duach Bay in December, 1890. Two Mealy Redpoles (*Linota linaria*) were shot in Achill Sound in February, 1893, by Mrs. Harvey; Mr. Sheridan thinks this bird visits Achill every winter. An adult male Buffon's Skua (*Stercorarius parasiticus*) was shot by Mr. Sheridan on 29th December, 1892, near the village of Duach.

Woodlarks (Alauda arborea), breeding in Co. Wicklow.—After an absence of many years, five of these birds were observed in this locality during October, 1893. They remained all through the winter, and on the 26th of April we were fortunate enough to discover the nest of one pair which contained three young birds and an addled egg.—JOHN HUNTER, Woodenbridge, Co. Wicklow.

Woodcocks in May.—A correspondent writes to the *Limerick Chronicle* (May 3rd), "that a day or two since, Mr. Mollison, gamekeeper to the Hon. W. C. Trench, of Castleoliver, Kilfinane, found a Woodcock, with three young ones apparently about a fortnight old, in the demesne, near the castle."—ERNEST BENNIS, Limerick.

GEOLOGY.

Kitchen Middens in Co. Donegal.—These were examined and described years ago by Mr. Harte, County Surveyor, before the Royal Geol. Soc., Dublin, and more recently by Mr. Mahony, of Ramelton, in a paper read before the Geol. Soc., Glasgow. The inquiries of both these observers extended round the north and north-west coasts of Donegal. Subsequently, after examining those of Co. Antrim, I examined them, and was surprised to find the contents so different in some respects, that is, the total absence of worked implements and pottery—yet in this portion of Donegal and in Antrim both appeared to have been of very similar age, that is, they were commenced on Murrish, or Sea plains, before the accumulation of the dunes of Æolian Drift.

In Innishowen, Fanad, Roscuil, and Falcarragh, besides bones and shells, were only found the rudest implements, such as slabs for breaking on, and adapted stones that had been used as breakers, and "fire stones." What were the latter used for? Were they heated and the fish fried on them? Or were they used for boiling purposes? The latter in these cases seems improbable; because if they were, we ought to have found, as in the Co. Antrim, the rude clay pots in which the water was boiled. The absence of flint implements seems remarkable, as Antrim flints appear to have been largely imported into Donegal and manufactured.

Near Knockbrack, to the south of Letterkenny, there seems to have been a factory at Curragh—as numerous chips, cores, and implements have been found there; while at the Brown Rock, between Letterkenny and Church Hill, a large bunch of worked flints were found—also in various places about the Kilmacrenan Barony, especially north ot Rathmullen, worked flint can be picked up in the tillage. Curiously, in the south-west of the Donegal County, in the sand-dunes of the Bundoran neighbourhood, arrow-heads, made of the chert from the Carboniferous Limestone, were found in the Kitchen Middens by Mr. Knowles, of Ballymena. Why should worked implements be found at Bundoran to the south-west, and in Antrim to the east, while along the intervening coast in the Kitchen Middens of apparently the same age they have not been found?—G. H. Kinahan, Fairview, Dublin.

PROCEEDINGS OF IRISH SOCIETIES.

Royal Zoological Society.

Recent donations comprise a Rabbit from Master H. Harvey; a Monkey from T. G. Waterhouse, Esq.; two Long-eared Owls from H. L. Jameson, Esq.; three Stoats and a Guinea-fowl from Master R. L. Weldon; and eight Guinea-pigs from J. Condon, Esq. A large number of animals have been acquired by purchase, including a Malayan Bear, a Serval, a pair of Cranes, of Weka Rails, of Blood-breasted Pigeons, and of Laughing Kingfishers; a Brown Lemur, a Hog Deer, three Mandrills, a Baboon, a Puma, two Marmosets, a Bear, two Porcupines, two Griffon Vultures, four Red-shouldered Starlings, two Rosellas, twelve Rufous Weaver-birds, two Grey Parrots, a Purple-capped Lony, and three Egrets.

Upwards of 10,000 persons visited the Gardens in April.

Dublin Microscopical Club.

April 19th.—The Club met at Dr. R. F. Scharff's.

Mr. Greenwood Pim showed *Lachnea* (*Peziza*) *umbrosa* sent to him by Professor Johnson, who found it at Howth last autumn. The sporidia are beautifully verrucose, in this point differing very markedly from *L. stercorea*, which is exceedingly similar in general appearance; from its nearer ally, *L. hirta*, the present species is distinguished by the almost

globose instead of oval sporidia. Both *L. hirta* and *L. umbrosa* are probably often passed by in mistake for *L. stercorea*.

Mr. G. H. CARPENTER showed *Dicranolasma scabrum* and *Amopaum Sorensenî*, two remarkable phalangids of the family *Trogulidæ*, brought from Corsica by Dr. Scharff.

DR. M'WEENEY showed preparations from the blood of a man affected with the disease known as spleno-medullary leukœmia. Nucleated red blood corpuscles were very numerous, and every stage of eccentricity in the position of the nucleus could be traced, from a position only slightly distant from the middle of the cell to an extremely peripheral one, and in many cases the nucleus could be seen protruding. Finally nuclei might be seen on the outside of the cells, and connected therewith only by a short bridge of nuclear substance, and numerous free nuclei were likewise to be found. The recognition of the latter was much facilitated by the very remarkable metachromatism which the nuclei of the erythroblasts showed as compared with those of the neighbouring leucocytes, a much deeper tinge being invariably struck with the nuclear stain. These observations appeared to the exhibitor of considerable importance in view of the wide differences of opinion that prevail amongst physiologists regarding the exact mode by which the nucleus of the erythroblasts is got rid of. They seem to point unmistakably to extrusion of the nucleus—the view formerly adopted by Rindfleisch and now advocated by Howells, but by no means universally accepted. Appearances indicative of fragmentation, and also perhaps of mitotic division, in these nuclei were likewise demonstrated. The power used was Leitz's oil-immersion, $\frac{1}{16}$ in., giving, with the low eye-piece, a magnification of about 900 diameters.

Mr. M'ARDLE exhibited a fertile specimen of *Eulejeunea patens*, Lindberg, var. *erecta*, M'A., which he gathered on Ross Island, Killarney, in November of last year. From copious material he gives the following characters by which this new form may be detected:—Plant about a quarter of an inch long, growing on damp peat in dense compact patches of a bright yellow colour. Stem stronger than in the type, erect, irregularly branched, often secund, bearing numerous rootlets in isolated tufts up to the apex, which show well marked haustoria. Leaves closely imbricated, densely chlorophylliferous in the upper $\frac{2}{3}$ of the plant Under-leaves (stipules) larger than in the species, ovate or sub-rotund, cleft for more than $\frac{1}{3}$ of their length into two obtuse (often acute) lobes. Amentæ short, consisting of four to six altered leaves. Perianths copious, lateral, sharply keeled, stalk of the capsule with three or four distinct articulations.

BELFAST NATURALISTS' FIELD CLUB.

APRIL 17th.—Irish night. The President in the chair. The programme included report of work done by the Celtic class, by Mr. P. J. O'SHEA, conductor of the class; readings and recitations in Irish, by Miss Milligan, Miss Carey, Dr. St. Clair Boyd, and Messrs. Ward, Foley, Griffin, and Morrissey; and a paper on local Celtic topography, by Mr. F. J. BIGGER.

APRIL 25th.—Annual meeting. The President in the chair. The Secretary (Mr. F. J. BIGGER) read the annual report, and the Treasurer (Mr. W. H. PHILLIPS), the statement of accounts, which were adopted. The report stated that the roll of members now stood at 480. The election of office-bearers was next taken up. Mr. F. W. LOCKWOOD was elected President, and Mr. LAVENS M. EWART, M.R.I.A., Vice-President. The Secretary and Treasurer resumed office, as did the Committee, with some slight alterations. The Secretaries of Sections then presented their reports as follows:—Miss S. M. Thompson, report of Geological Committee; P. J. O'Shea, report of Celtic class; Dr. St. Clair Boyd, report of Microscopical Section; W. H. Patterson, report of Ethnographical Committee. Suggestions for the improvement and extension of the Club's work were then considered.

Dublin Naturalists' Field Club.

April 28th.—Excursion to Kill-o'-the-Grange and Killiney. A party of twenty-five members proceeded by 12.45 train to Kingstown, where cars were in waiting to convey them to Kill-o'-the-Grange Brickworks. Fine sections of bluish Boulder-clay were examined here, in which marine shells of the genera *Astarte*, *Tellina*, &c., were observed. A section of sand and gravel was also visited. Professor Sollas, F.R.S., who conducted the party, briefly explained the nature of the deposits, and the theories as to their formation.

The early season was witnessed by the discovery here of *Trifolium procumbens* in full flower, while *Arum maculatum* had almost finished blossoming. Sterile stems of *Equisetum palustre* were observed near the brickworks by Dr. M'Weeney, who also searched the locality for fungi. Agarics were, as might have been expected, scarce; *Coprinus micaceus*, Fr., *Panæolus phalenarum*, Fr., and a few other manure-loving species alone being found. A fine specimen of *Polyporus* (*Fomes*) *fomentarius* was observed on a stump, while leaf-fungi were represented by *Puccinia malvacearum*, Mont., and *Synchytrium taraxaci*, De By.

A rapid drive brought the party to Killiney, where some interesting geological features on the summit of Ballybrack Hill claimed attention. Along the junction of the granite and Ordovician rocks, the former has invaded the latter rock along the cleavage-planes, with the result that in places the shales have been entirely eaten up, nothing remaining to attest their presence but bands of black mica in the granite. The botanists of the party were well pleased to find among the gorse and rocks, abundance of the rare *Corydalis claviculata*, some of the plants already in good flower.

Descending to the beach, the remainder of the afternoon was devoted to investigating the fine sections of the drift that extend continuously from Killiney to Bray, and which were recently described in the *Irish Naturalist* by Professor Sollas (January, 1894, p. 13).

Along the shore the botanists found *Honkeneja peploides* already in flower, and *Viola arvensis* was taken by Dr. M'Weeney in a grass field near the mouth of the Loughlinstown river. The locality was not apparently an inviting field for entomologists, but Messrs. W. F. de V. Kane and G. H. Carpenter were fortunate enough to discover numerous specimens of *Clunio marinus*, Halid., a small marine dipteron which seems to have been overlooked since its describer, nearly forty years ago, took it on the coasts of Kerry and Dublin. The present discovery was specially gratifying, as among a colony of the midge observed upon a rock covered by green seaweed (*Cladophora*) two examples of the hitherto unknown female were obtained, and this sex is found to be wingless. Subsequent examination of the *Cladophora* disclosed a larva—also unknown hitherto. (A preliminary note by Mr. Carpenter, with figures, will shortly appear in the *Ent. Mo. Mag.*). Prof. Johnson and Mr. R. J. Mitchell assiduously collected seaweeds, but were not rewarded by any form new to the coast. Tea was provided at the Bray Temperance Hotel, after which a short business meeting was held for the election of new members.

Royal Irish Academy.

April 9.—Mr. G. H. Kinahan read a paper on Quartz, Quartzite, and Quartz-rock. Mr. Kinahan has already laid before readers of this Journal his views as to the origin of these rocks (*I.N.*, 1892). Prof. Sollas, F.R.S., and Mr. McHenry (H.M. Geol. Survey) took part in the discussion that ensued

The Irish Naturalist.

Vol. III. JULY, 1894. No. 7.

THE IRISH FIELD CLUBS.

BY R. LLOYD PRAEGER, B.E.,
Secretary Dublin Nat. Field Club; Ex-Secretary Belfast Nat. Field Club.

I.—The Belfast Naturalists' Field Club.

In these modern days, when the number of persons who take an intelligent interest in the natural phenomena by which they are surrounded is steadily increasing, and when the army of observers and investigators in every department of science grows larger year by year, any institution whose object is the advancement of science, and especially the popularization of science, is sure to have our sympathy; and in no way, perhaps, has more been done to popularize natural science, and to enlist fresh recruits in scientific work, than through the instrumentality of the various Naturalists' Field Clubs which are scattered through the country. Carried on on a popular basis, and with a low subscription rate, the advantages of these societies are within the reach of all; and especially by their summer excursions, when the field naturalists have an opportunity of visiting selected localities under scientific guidance, are the members brought into actual contact with nature—the more so since skilled workers in the various "ologies" are generally present, who are able and willing to impart the lore pertaining to their several crafts, and thus to reveal to untrained eyes the thousand marvels that lie hid in field, and wood, and stream, and rock.

Here in Ireland, we cannot boast that by any means so general an interest is taken in natural science as in England; but within the last decade there has been a most gratifying and encouraging increase in the number of workers; and a result of this has been that the Belfast Field Club, for over 20 years the only society of the kind in Ireland, received in 1887 a comrade in the shape of the Dublin Naturalists' Field

Club; while within the last two years it has been our pleasant duty to record in these pages the foundation of similar societies in Cork and Limerick. I have thought that a short sketch of the history and work of each of these Clubs may be of interest to readers of the *Irish Naturalist;* and we shall begin with the oldest and also the largest of the Irish Field Clubs, the

BELFAST NATURALISTS' FIELD CLUB.

We find the stimulus which resulted in the foundation of this Club in the courses of lectures in geology, botany, and zoology delivered in Belfast under the auspices of the Science and Art Department by Mr. Ralph Tate (now Professor Tate, F.G.S., of Adelaide University) during the winter of 1862-3. Mr. Tate possessed in a rare degree the power of interesting his hearers, and drawing them with him into the regions of science, and his lectures were largely attended, and his students remarkably successful in the examinations that were subsequently held under the Department. As a practical outcome of Mr. Tate's teaching and example, we find, in the Belfast Press of January, 1863, letters advocating the formation of a Naturalists' Field Club. The first suggestion came from "W. T. C." (William T. Chew), and his letter was soon followed by two others, signed "A Young Geologist" (Hugh Robinson), and "S. A. S." (Samuel Alexander Stewart). With the hearty co-operation of Mr. Tate, the preliminary steps were soon taken, and a public meeting was held in March, when the Club was formally constituted, and members were enrolled. Looking at the prospectus which was then issued, of which I possess almost the only copy now in existence, we find that the first President (then "Chairman of Committee") was John Grainger, M.A., subsequently Rev. Canon Grainger, D.D. The first Secretaries were Mr. Tate and Mr. Chew; while the two other originators of the Club took places on the Committee. Of these, Mr. Chew's name disappears early from the Club records, owing to his removal to London. Canon Grainger and Mr. Robinson maintained a warm and active interest in the Club until their deaths, but a few years; and Mr. Stewart has, during, the thirty-one years that have elapsed, held his place on the Committee, and holds it still, a loved and honoured member. The prospectus concludes with the list of original members, 107 in number, among which it is pleasant to notice

the names of not a few who are still members of the Club, and of others who have left behind them indelible records in the annals of science—notably Prof. Wyville Thomson, of "Challenger" fame, and Prof. James Thomson, afterwards of Glasgow University.

Founded thus auspiciously, the Club steadily grew, notwithstanding the loss by removal to London of both Mr. Tate and Mr. Chew at the end of the first year of its existence; at the end of the fifth year, we find the membership has risen to over 200, and its annual report, which has been steadily increasing in bulk, now extends to 50 pages. Two years later the annual report gives evidence of a new departure, in the publication of the first of the "Appendices" which have since been issued from time to time—being local lists of various divisions of the fauna and flora of the North of Ireland, or descriptive papers of its archæology; the first contribution being appropriately a "List of Irish Liassic Fossils," by Mr. Tate. During the winter of 1869 a partial fusion with the Belfast Natural History Society was carried out. This latter Society was already in the prime of life, having being founded in 1821, and having in its ranks a number of gentlemen eminent in natural science. The first joint meeting was held in November, 1869, when Dr. Wyville Thomson delivered an address on "The Aims of Natural History Societies, and the uses of Local Museums." During the next year, however, this connection was dissolved.

In anticipation of the Belfast meeting of the British Association in 1874, the Field Club undertook the preparation of a local guide-book, and though the time was very limited, they succeeded in producing a volume of over 300 pages, dealing with the fauna, flora, geology, archæology, trade and statistics of the district, which is a worthy proof of the energy and attainments of the Club members at that time.

The year 1875 records the retirement from the Secretaryship of Mr. William Gray after ten years of office; to his zeal and energy is largely due the progress made by the Club during that period. Five years later his worthy colleague, Mr. Hugh Robinson, retired, after 11 years of office; these vacancies were filled up by the appointment of Mr. William Swanston and Mr. F. W. Lockwood, who faithfully carried on the work of the Club for periods of 15 and 11 years respectively. The year

1875 also witnesses the adoption of the title of "Annual Report and Proceedings" for the Club's publication, which had by this time assumed the proportions of an annual instalment of 80 to 100 pages.

The years 1875 to 1890 provide a record of steady prosperity, and good work, as witnessed by the numerous "Appendices," so that in 1886, a volume of these was published in collected form, comprising twenty-one papers illustrated by twenty-seven plates, and dealing with the Foraminifera, Coleoptera, Ostracoda; Post-tertiary, Glacial, Cretaceous, Liassic, Carboniferous, and Silurian Fossils; Fungi and Mosses; and Cromlechs of the North of Ireland. The summer excursions and winter meetings went on regularly, with good attendances, while the membership fluctuated between 220 and 300. The Presidents during the first decade had been Canon Grainger, D.D., George C. Hyndman, and Professor James Thomson, F.R.S.; during the second decade the office was held in succession by John Anderson, F.G.S., Canon M'Ilwaine, D.D., William Gray, Robert Young, and Lieut.-General Smyth, F.R.S.; while the interval up to 1890 was filled by W. H. Patterson and Hugh Robinson, two of the original office-bearers of 1863.

In 1890 the retirement of Mr. Swanston from the post which he had so honourably held for 15 years, led to the appointment of the writer to the Secretaryship; and when a year later Mr. Lockwood asked to be relieved of his duties, Mr. F. J. Bigger was selected to fill the vacant place. It was about this time that there began that increase of interest in Irish science of which I have already spoken, and which is witnessed by the establishment of the three other Irish Field Clubs, and also of the *Irish Naturalist*. Its influence soon became apparent in the Belfast Club, and taking advantage of the flowing tide, the Club rapidly advanced in numbers and in popularity, so that, with a membership of 250 in 1890, the list at the time of writing stands within one or two units of 500. This great increase of membership has been accompanied by a corresponding widening of the sphere of scientific work, and of the amount of work done. It has been found desirable to form sections for the prosecution of special branches of research, and at present there are five such sections in operation. The Microscopical Section is the oldest, being started in 1891, and under the Secretaryship of Dr. St. Clair Boyd is doing good

work. The Photographic Committee have under their care the formation of an illustrated antiquarian survey of the district, which already numbers 400 platinotype photographs, and is rapidly increasing, thanks to the generosity of the photographers of the Club, and especially of that talented artist Mr. Robert Welch. The Ethnographical Section is engaged at present chiefly in collecting local folk-lore, under the Secretaryship of Mr. W. H. Patterson, and it is connected with the Ethnographical Committees in Dublin and London, which Professor Haddon has been instrumental in bringing into existence. The operations of the Celtic Section consist of a weekly class for the study of the Irish language, which is ably conducted by Mr. P. J. O'Shea, a member of the Club. And lastly the Geological Section, of which Miss S. M. Thompson is Secretary, is hard at work on the Glacial deposits of the district, and the first report, which was recently submitted to the Club, shows that interesting results have already been obtained, and gives good promise for the future.

The Presidential chair since 1890 has been filled by Mr. William Gray, Mr. John Vinycomb, and Mr. W. Swanston, and each of these gentlemen has done much to aid Mr. Bigger and myself in our secretarial work. My own removal to Dublin last year has thrown the entire work of the Club on my late colleague, under whom the Club is still rapidly increasing in numbers and usefulness. Nor must mention be omitted here of the successful course of lectures delivered under the auspices of the Club last winter by Prof. Grenville Cole, which have stirred up much interest in local geology, and strengthened to a considerable extent the Geological Section of the Club. I understand that courses of lectures on similar lines are to be delivered next session, and there can be no doubt that in this direction the Club is performing most valuable educational work.

In no way is the prosperity and usefulness of the Belfast Naturalists' Field Club better shown than by its annual Proceedings. Commencing in 1865 with a 12-page pamphlet covering two years of work, this publication has steadily grown, so that the last issued part (1892-3) comprises 170 pages of letterpress, with nine plates and ten other illustrations, and includes important contributions to the fauna, flora, geology, and ethnography of the North of Ireland.

A BOTANICAL TRIP TO CO. ANTRIM.

BY W. A. SHOOLBRED, M.R.C.S., CHEPSTOW.

THE following notes are from observations made during a short trip to County Antrim in July, 1893.

My chief object, botanically, in visiting this part of Ireland was to make a collection and take notes of the *Hieracia* of the cliffs and glens.

By the middle of July in an ordinary season most of the species of this genus would have been at their best; but owing to the long, hot, and dry summer many of those growing in exposed parts of the cliffs were too far gone for identification. In fact the majority of the cliff-plants had long since gone to seed, and many were quite dried up.

My first day at Belfast was anything but propitious; there was an incessant downpour of rain until six in the evening. It was almost the first rain I had seen for nearly three months. However, after it had ceased, Mr. S. A. Stewart kindly went with me to Holywood for *Rosa hibernica*. This rose does not appear to ripen its fruit, at least in this locality. On the marshes near we gathered *Œnanthe Lachenalii*, and searched some time for *Zannichellia polycarpa* in the shallow water, where Mr. Stewart had always before seen it in abundance; but although nearly poisoned by the stench caused by stirring up the sewage, we failed to find a single piece. Mr. Stewart has since sent me specimens from a deep drain near by, where he subsequently found it in plenty. The dry weather had doubtless caused the sewage in the shallow water to become too concentrated for the plants to live.

Next day, after I had visited Cave Hill, Mr. Stewart again joined me in the evening in a walk to part of the Black Mountain for *Pyrola media*, which, like so many other plants, had gone out of flower. *Melampyrum sylvaticum* we failed to find in its locality here, it having probably seeded down and died off.

From Belfast I went on to Larne, staying there for one night in order to visit Sallagh Braes. Unfortunately I did not give myself enough time for this expedition, and the heat when the cliffs were reached was too great for much scrambling after a mid-day walk from Larne.

From Larne I went on round the coast, staying at Cushendall, Ballycastle, and Giants' Causeway; thence to Derry for steamer to Glasgow. On the way from Portrush to Derry the journey was broken for a few hours to visit Benevenagh.

My longest stay was at Cushendall. Finding that a good centre, and surrounded by fine botanising country, my quarters also at 'The Glens of Antrim' being everything that could be wished, I remained there a week, which was longer than I had intended, and so had less time for working the country further on. Two days out of the week, however, it rained in such torrents that out-door work was well nigh impossible. The rest of the time the heat in the glens was almost tropical.

The coast scenery of County Antrim is certainly very fine, and would alone have repaid one for the trip. The contrast between the white Chalk cliffs with their capping of dark basalt and the deep red sandstone of Red-bay has a very striking effect. The Giants' Causeway, so interesting to the geologist, seemed rather barren botanically.

With a flora so varied, including as it does a considerable number of maritime forms, the luxuriant vegetation of the glens with their wealth of ferns and other shade-loving plants, and a cliff flora including several highland types, I was surprised at the rarity, or total absence from the district, of many species which are of common occurrence in the West of England. The common Yew and the White Beam, which form quite a feature in many of the wooded valleys of this part of England, were conspicuous by their absence. Among others of our common plants which I did not see in County Antrim were *Papaver Rhœas*, *Malva moschata*, *Bryonia dioica*, *Galium Mollugo*, *Lamium Galeobdolon*, *Tamus communis*, &c. Mr. Stewart tells me that one of the rarest plants in N.E. Ireland is the Moschatell, which may be found here in almost every hedgerow, and completely carpets some of the woods in early spring. I also failed to notice any of the sub-erect *Rubi*, but as they were not specially searched for they may have been overlooked.

The flora of the North-East of Ireland has been so thoroughly worked that it is unlikely that I can add much, if anything to what is already known. Mr. Praeger, however, tells me that two species of *Hieracium* and a variety of another species have not previously been recorded from the district.

One or two of the *Rubi* may be new records—*R. Selmeri*, at least, has only within the last few months been described as a British plant by the Rev. W. M. Rogers.

I am indebted to the Rev. W. M. Rogers for looking over my collection of Brambles and Roses; to Mr. Hanbury for putting me right as regards the *Hieracia*, and to the Rev. E. S. Marshall for naming some varietal forms of other plants.

LIST OF RARER PLANTS.

Fumaria pallidiflora, Jord.—The Rev. S. A. Brenan drew my attention to this growing in a hedgerow at Knocknacarry.

Nasturtium palustre, DC.—Glendun.

Arabis sagittata, DC.—Benevenagh, Co. Derry. I have no note of this from the Antrim cliffs. This plant appears to be rare in N.E. Ireland. It is very common on limestone cliffs and walls in this part of the West of England.

Draba incana, L.—Sparingly on the higher part of the cliffs at Benevenagh.

Cochlearia Armoracia, L.—Near Cushendun—garden escape.

Viola palustris, L.—Boggy ground, Glenariffe; Glendun; Fairhead, and near Ballycastle.

V. canina, L.—Cushendun, near the shore.

Polygala vulgaris, L.— } Common.
P. serpyllacea, Weihe.— }

Silene acaulis, L.—Fairly plentiful on Benevenagh.

Arenaria verna, L.—Plentiful on the cliffs on the south side of Glenariffe, and on Benevenagh.

Geranium lucidum, L.—Glenariffe.

Melilotus altissima, Thuill.—Glenariffe.

Trifolium medium, L.—Rocks near Ballintoy.

T. procumbens, L.—Glenariffe.

Lotus pilosus, Beeke.—Glenariffe.

Vicia sylvatica, L.—Glenariffe.

Prunus Padus, L.—One or two small trees seen in Glenshesk near the river.

Rubus rhamnifolius, W. & N.—Glenariffe and Glendun.

R. pulcherrimus, Neum.—Cave Hill; Glenariffe; Glendun; between Cushendall and Knocknacarry, &c. Of a specimen from Cave Hill, Mr. Rogers writes "with unusually broad panicle," and of specimens from near Larne "I believe *pulcherrimus*, but in a form I do not remember to have seen before."

R. villicaulis, Kœhl.—Glenariffe and Glendun.

var. **Selmeri,** Lindeb.—Glendun. Mr. Rogers writes "exactly like a form of *villicaulis*, common in the south of England, which is var. *Selmeri*, Lindeb."

R. Lindleianus, Lees.—Glenariffe and Glendun. A very striking-looking form as regards foliage, grows in Glenariffe, which Mr. Rogers considers cannot be kept separate from *Lindleianus*. It has unusually broad terminal leaflets, and very large panicles.

R. rusticanus, Merc.—Near Larne; Glenariffe; Glendun, &c.

R. pyramidalis, Kalt.—Glenariffe.

R. leucostachys, Schleich.—Cave Hill; near Larne; Glenariffe, &c.

R. radula, Weihe.—Hedge-rows near Larne.

R. echinatus, Lindl.—Cave Hill; Glenariffe; Glendun, &c.

R. rosaceus, W. & N., var. **hystrix** (W. & N.)—Glenariffe. Mr. Rogers writes "A strongly armed form."

R. Kœhleri, W. & N.—Glenariffe and Glendun.

R. dumetorum, W. and N.—Cave Hill; near Larne, &c. Of a plant from near Larne Mr. Rogers writes "I think it must be a very weakly-armed form of aggregate *dumetorum*. The foliage is very like that of our var. *diversifolius*, but the armature quite different."

R. corylifolius, Sm., var. a. **sublustris,** (Lees)—Common.
var. b. **conjungens,** Bab.—Near Larne.

R. saxatilis, L.—Frequent. In company with Mr. S. A. Stewart I gathered this in good fruit on the Black Mountain near Belfast.

I have notes of having seen *R. erythrinus*, Genev., and *R. micans*, Gren. & Godr. in Glenariffe and Glendun, but as I did not secure specimens I think it advisable not to include them in the list. The *Rubi* in these glens require and would repay careful working.

Potentilla procumbens, Sibth.—Glenariffe; Glendun; and Glenshesk.

P. procumbens x Tormentilla—(*P. suberecta*, Zimm.)—Glenshesk. The Rev. E. S. Marshall kindly examined and named this plant for me.

Agrimonia odorata, Mill.—Glendun.

Rosa involuta, Sm.—Glendun; "a form of *involuta*," but the material sent was too imperfect for Mr. Rogers to name definitely.

R. mollis, Sm.—Glendun and Glenshesk.

R. tomentosa, Sm., var. **scabriuscula** (Sm.)—Near Cushendall. A form very near *sylvestris* (Lindl.), gathered with Mr. Stewart on the Black Mountain near Belfast.

R. rubiginosa, Linn.—Mr. Praeger had asked me to look out for *R. micrantha* at Cushendun, and Mr. Brenan kindly showed me the bush whence the specimens had been gathered on the evidence of which this rose was included in the "Flora of the North-East of Ireland." Mr. Rogers writes of specimens submitted to him "not *micrantha*. A form of *rubiginosa*."

R. canina, L., var. **lutetiana** and **dumalis**—Common.
var. **subcristata,** Baker.—Glendun, and sandy ground by the river in Glenshesk.

R. arvensis, Huds.—Remarkably scarce. One or two bushes seen in Glenariffe and Glendun.

var. **bibractiata** (Bast.)—Hedgerow near Cushendun.

(TO BE CONCLUDED).

THE HIGH AND LOW-LEVEL SHELLY DRIFTS AROUND DUBLIN AND BRAY.

BY T. MELLARD READE, F.G.S.

(*Concluded from page* 121).

It is now time to get to the *pièce de resistance*—the shelly gravels of the Three Rock Mountain, first disclosed to the scientific world by the Rev. Maxwell Close. I am specially interested in these deposits from a previous study of similar gravels in England and Wales. We examined the gravel pits at Ballyedmonduff, reached by us from Glencullen. They are evidently continuously connected with the valley drift, and these high-level gravels occupy a considerable area. The gravel is mostly of limestone, with a good proportion of granite boulders, also felstone, porphyry, Silurian grit, and purple conglomerate. The gravel is interbedded with sand, loamy sand, and sand and gravel. Some thin contorted bands of sand are to be seen. Shell fragments are common. No attempt was made at collection; and for a list of the species of mollusca found, the reader must refer to Mr. Close's original paper in the *Geological Magazine*, 1874, entitled "The Elevated Shell-bearing Gravels near Dublin."

A mechanical analysis of two specimens of the finer part of the drift showed that the finer gravel was well worn, and mostly limestone, mixed with sub-angular gravel. Some pieces of black limestone occurred, very polished and slightly striated. Among the smaller grains were well rounded and polished grains of quartz, also calcite, mica flakes, and very decayed grains of shell substance. Three minute siliceous cylindrical bodies were found in this material, and similar bodies occurred in other specimens of the drift from several localities, as well as in the Greenhills esker, at Balrothery, presently to be described. Dr. George G. Hinde, F.G.S., to whom these were submitted, pronounces them to be sponge-spicules. He writes: "They are for the most part portions of the long cylindrical spicules, of which the anchoring ropes of hexactinellid sponges, like the still existing *Hyalonema*, were composed, and they are the sponge remains most commonly present in Carboniferous cherts and limestones in Britain." The analysis disclosed the fact, that there was a considerable

amount of granitic gravel and detritus among the other material.

Further on we examined the site of an old gravel-pit, formerly a mound or mammelon, but now levelled and grass-grown. We had no time to examine the other numerous pits scattered about the mountain and mentioned in Mr. Close's paper, but I saw sufficient to enable me to understand the deposit in the light of the other high-level shelly gravels I have seen and studied.

Those interested in glacial phenomena should not omit to visit Loughs Bray. At Curtelstown in Glencree, on the road to these interesting corries, is a gravel-pit west of the Roman Catholic Church, in which the gravel is mostly granitic detritus mixed with some limestone pebbles, and containing many large granite boulders. Notwithstanding the unlikely-looking aspect of this material, a few minutes search resulted in the discovery of a fragment of a bivalve. The level is about 770 feet above the sea. Lower Lough Bray is about 1,225 feet above sea level, and Upper Lough Bray 1,480, according to my aneroid observations. The striking feature of these corries or cwms is that they are all in granite, and the moraines that enclose their lower margins, considering the small area from which the material can have come, are remarkably large. The moraine of the upper lough rises 80 feet above the surface of the water, and is very broad at the base, in fact shades off into the valley below in great parallel undulations. One block perched on the summit I estimated to be 25 feet high. The upper part of the inner slope of the moraine was at an angle of 35 degrees. The great bulk of material in these moraines must have taken a great length of time to accumulate, and evinces a long life of the small glacier that made them.

We have now nearly come to the end of the descriptive part of this paper, but must pause to say something of the Greenhills esker. The question of the origin of eskers I do not propose to discuss here. It is a subject to be considered apart from the general glacial drift, and demands much more careful consideration than it has yet received. Our exploration of the Greenhills esker was confined to one day. We began at the Balrothery end. I am simply recording facts, and refrain from drawing any inferences from them. A very careful search in the gravel-pit at the Balrothery end of the esker, the first we came to, rewarded my son Aleyn with the discovery of a small

portion of a *Turritella terebra*, and myself with a rounded and chalky shell fragment pronounced by Mr. R. D. Darbishire, F.G.S., to whom all the shells were submitted, to be a portion of a *Mya*; also some extremely minute but indeterminable shell fragments. A specimen of the finer material of the esker was mechanically analysed; the material proved to be mostly dark and grey limestone, the grains being pretty well rounded. Amongst it were some sponge spicules and two grains having shell-structure. Some pebbles of granite were found in the gravel at this end. We walked along the top of the esker, and examined other gravel-pits, but the material appeared to be very barren, and the granite seemed to be absent. At the northern end the gravel and loam is seen to be horizontally bedded, and at one part a deposit that might be called boulder-clay occurred.

A story is nothing without a moral, and a geological paper without conclusions. The phenomena described ranged well with most of the observations of high and low-level drift it has been my good fortune to see. It supplements some of the defective portions of the story as told in deposits elsewhere, and strengthens other conclusions. It appears to me to lend no support to the Irish Sea Glacier hypothesis. The general drift of the materials has been from the north-west, and they have been swept from the limestone plain far on to the granite mountains. The major part of the granite debris is doubtless from the Wicklow Mountains, and some of this has travelled north on to the limestone. Granite from the Mourne Mountains and from Newry are, I believe, found in the drift, but I had neither time nor the requisite local petrological knowledge to follow up this part of the problem. Triassic rock from the North I have already recorded. Professors Cole and Sollas have found the Ailsa Craig riebeckite in the drift as far south as Greystones. Flints from Antrim are common. There is a commingling of rocks here, as in the drifts of England and Wales, but not perhaps from so great a base-line. The whole of the phenomena in my judgment points to submergence. This is not the place to appraise the relative value of the facts recorded, but those who wish to pursue the subject further on the lines here sketched out may be referred to the article in *Natural Science*,[1] on high-level shelly sands and gravels in which I have discussed some of the questions from several points of view.

[1] Vol. iii. (Dec. 1893.)

So ends the simple record of a very enjoyable time spent in Ireland, which from the pleasant aid rendered, the perfect weather, and the interesting nature of the geology and scenery, will not readily be effaced from the memory.

INSECTS COLLECTED BY THE ROYAL IRISH ACADEMY FLORA AND FAUNA COMMITTEE, 1893.

BY REV. W. F. JOHNSON, M.A., F.E.S., J. N. HALBERT, AND GEORGE H. CARPENTER, B.SC.

COLEOPTERA.

(*Continued from page* 124.)

PSELAPHIDÆ.

Bryaxis fossulata, Reich.—Ballyhaise.

SILPHIDÆ.

Anisotoma punctulata, Gyll.—Coolmore. Only other Irish locality is Portmarnock.

A. calcarata, Er.—Coolmore.

Necrophorus humator, F.—Coolmore, in dead gulls.

N. ruspator, Er.—Coolmore, in dead rat.

Necrodes littoralis, L.—Coolmore, in dead gulls. Only other Irish localities are Armagh and Dublin.

Silpha rugosa, L.—Coolmore, common in carrion.

S. atrata, L. var. **subrotundata,** Steph.—Coolmore. Very common about Cavan, the black form at Oak Wood, Ballyhaise. Berehaven. Killarney (brown form).

HISTERIDÆ.

Onthophilus striatus, F.—Slieve Glah, by sweeping in a marshy spot.

COCCINELLIDÆ.

Adalia obliterata, L.—Farnham.

Coccinella x-punctata, L.—Coolmore.

C. hieroglyphica, L.—Coolmore. Berehaven. Hitherto recorded only from Churchill, County Armagh, and Waterford.

C. xi-punctata, L.—Coolmore, common in the sandhills.

C. vii-punctata, L.—Berehaven. Cavan.

Halyzia xviii-guttata, L.—Ballyhaise.

H. conglobata, L.—Oak Wood, Ballyhaise. Haliday records it from near Belfast, and Fowler from "the south of Ireland."

H. xxii-punctata, L.—Common about Cavan.

Coccidula rufa, Herbst.—Coolmore. Dundalk. Ballyhaise.

NITIDULIDÆ.

Epuræa florea, Er.—Coolmore. Carlingford.

Meligethes æneus, F.—Coolmore. Carlingford.

TROGOSITIDÆ.

Tenebrioides mauritanicus, L.—Coolmore, in a loaf of bread.

CUCUJIDÆ.

Rhizophagus dispar, Gyll.—Coolmore.

LATHRIDIIDÆ.

Cononimus nodifer, Westw.—Cavan.

Enicmus minutus, L.—Coolmore. Cavan.

E. transversus, Ol.—Cavan.

Melanophthalma gibbosa, Herbst.—Wood at Cultragh Lough.

CRYPTOPHAGIDÆ.

Cryptophagus scanicus, L., var. **patruelis,** Sturm.—Coolmore.

C. cellaris, Scop.—Coolmore.

***Paramecosoma melanocephalum,** Herbst.—Banks of River Annalee, near Ballyhaise.

BYTURIDÆ.

Byturus tomentosus, F.—Carlingford.

BYRRHIDÆ.

Byrrhus pilula, L.—Berehaven.

Cytilus varius, F.—Shores of Lough Oughter under stones. Slieve Glah.

Simplocaria semistriata, F.—Coolmore.

PARNIDÆ.

Elmis parallelopipedus, Müll.—Coolmore. The other Irish localities are Waterford and near Bandon, Mr. Wollaston recorded it from the river Flesk, Killarney (*Zoologist*, 1847, p. 1571), and there are specimens in Mr. Haliday's collection from Lough Neagh.

Limnius tuberculatus, Müll.—Coolmore.

Parnus prolifericornis, F.—Coolmore. Shores of Lough Oughter.

LUCANIDÆ.

***Sinodendron cylindricum,** L.—Lough Oughter, dead specimens in a log of oak on the shore. Though this species seems never to have been definitely recorded, there are Irish specimens in the Haliday collection, and Mr. G. C. Champion took it at Bray in 1878.

SCARABÆIDÆ.

Aphodius fimetarius, L.—Coolmore. Ballyhaise. Berehaven.

A. ater, De G.—Coolmore.

A. prodromus, Brahm.—Ballyhaise. Dursey.

A. contaminatus, Herbst.—Ballyhaise.

A. rufipes, L.—
A. depressus, Kug.— } Coolmore.

Ægialia arenaria, F.—Coolmore.

Geotrupes stercorarius, L.—Coolmore. Berehaven.

G. sylvaticus, Panz.—Slieve Mishkish. Adrigole.

Serica brunnea, L.—Carlingford.

Phyllopertha horticola, L.—Berehaven; Hungry Hill. This chafer has been abundant in western Ireland during the last two summers, and serious damage to garden and clover crops has been reported as due to its ravages.

ELATERIDÆ.

Cryptohypnus riparius, F.—Coolmore.

Athous hæmorrhoidalis, F.—Berehaven.

Adrastus limbatus, F.—Dundalk, &c., common.

Agriotes obscurus, L.—Coolmore.

Corymbites quercus, Gyll.—Glengariff. We believe this to be the first record for S.W. Ireland; in fact there does not seem to be any record of its capture further south than Dublin.

DASCILLIDÆ.

Dascillus cervinus, L.—Adrigole. This also seems to be a new species in the south-west.

Helodes minuta, L.—Fathom.

H. marginata, F.—Adrigole.

Cyphon variabilis, Thunb. — Coolmore. Cavan, common. Killarney.

MALACODERMIDÆ.

Telephorus bicolor, F.—Berehaven.

Rhagonycha fulva, Scop.—Coolmore. Dundalk.

(*To be continued.*)

NOTES.

BOTANY.

FUNGI.

Two notable Morels—(Morchella elata and M. crassipes).—The Morel is almost the only fungus outside the ordinary mushroom, which is admitted—by others than Fungomaniacs—to be fit for human food; that is so far as Britain is concerned, for many others are commonly eaten abroad. The ordinary species, *M. esculenta* and *M. conica*, though nowhere very common, are found not unfrequently in various districts in suitable localities in April and May. They are usually about three or four inches high, the curious strongly ribbed pileus or cap being about half that size, and are generally met with in open spaces in woods, or partially shady banks.

Two remarkable forms came under my notice this year, both new to the Irish, and one, *M. elata*, to the British Flora. *M. elata* was sent to me from Clonbrock Demesne, by Mr. W. F. de V. Kane, and was shown

at a meeting of the Dublin Naturalists' Field Club, under the provisional, and, as it proved, erroneous name of *M. Smithiana* (see p. 111). Photographs, and subsequently, by the kindness of Lady Clonbrock, fresh specimens, were sent to Mr. W. Phillips, of Shrewsbury, the great authority on Fungi of this class, and he pronounced it without doubt as *M. elata*, Fries, and that it was the first British record. This species is described by Fries in his *Systema Mycologicum* as occurring in Italy, but rare. Cohn also records it in his *Kryptogamen Flora von Schlesien*. The specimen sent to me was nearly eleven inches high, and the pileus or cap four inches in diameter.

The second Morel was a very large and abnormal form of *M. crassipes*, and was found by Mr. Robertson in his garden at Ranelagh, Co. Dublin. It was quite distinct from the Clonbrock species in shape and on the arrangement of the ribs, the cap being rounded—while that of *M. elata* was markedly conical. I have to thank Mr. Phillips for kindly identifying this species also, as being quite abnormal. It did not accord at all with the figure in Cooke's *Mycographia*.

These two most interesting forms are preserved in the Dublin Museum —GREENWOOD PIM, Monkstown, Dublin.

PHANEROGAMS.

Rubus villicaulis Koehl., var. b. Selmeri Lindeb.—Rev. W. Moyle Rogers has lately (*Jour. Bot.*, Feb. 1894), identified the glabrous form of *Rubus villicaulis* with *R. Selmeri* Lindeb., a Scandinavian plant, and proposes to class it in future as var. b. *Selmeri*. The plant referred to from "N. Ireland" in his paper (p. 43) was gathered by me at Saintfield, in 1893. No doubt it will be found in other parts of Ireland. Mr. Rogers gives the following marks of distinction:—"It differs from typical *villicaulis* by its *long styles* (equalling or exceeding the stamens) its *strong falcate prickles*, its greener and more roundish lts., and its *much more glabrous* condition generally."—C. H. WADDELL, Saintfield, Co. Down.

Whins injured by frost.—It was strange to miss the usual golden bloom of the Whins or Gorse this spring. One would think such hardy plants could not have been injured so much by frost. Nevertheless the appearance of the country side here at Easter was quite altered by the brown and withered flowerless plants instead of the usual glow. I suppose it must have been caused by the severe frost in January coming upon them in a too advanced state of flower, for many began to flower in November.—C. H. WADDELL, Saintfield.

Henbane (Hyoscyamus niger) on Howth.—It may be of interest to note that there is this year an abundant growth of the Henbane on the southern slopes, close to the Bailey Lighthouse. This rather rare plant, notoriously erratic and irregular in its appearance, has probably not been long in this station, or it could not have escaped the vigilant eye of Mr. Hart, who gives Ireland's Eye as the only place in the Howth district in which the Henbane is known to grow.—R. LLOYD PRAEGER.

Cephalanthera ensifolia in Co. Waterford.—I was fortunate enough to find yesterday (June 1) a number of plants of *Cephalanthera ensifolia*, Rich. They were growing in a very wet, boggy place in the woods of Curraghmore. I gathered two specimens, one for my herbarium, and the other for planting in my garden. This represents a new District (ii.) in Ireland for this plant.

According to *Cybele Hibernica* it occurs in the following places:—District i., Glengarriff, Adrigoole, Co. Cork; xi., near Lough Eske, Donegal; xii., near Larne, Antrim; Shane's Castle Woods, shores of Lough Neagh. It has since (Recent additions to the Flora of Ireland, 1872, by Mr. A.

G. More) been found in three other localities in District i. I have, myself seen it growing at one of these localities, viz., in the wood near Lickeen House, Lough Caragh; but in 1891 there were only a few plants. It has also (*Journ. Bot.*, 1889) been found about half a mile east of Brickeen Bridge, Muckross (i.) A new station is mentioned in the June number of the IRISH NATURALIST viz., Hare Island, Lough Ree, Westmeath, which also adds another District (vii.)

In his description of the plant, Bentham (5th edition, revised by Sir J. Hooker, p. 438) says:—"The bracts very short, mostly one to two lines long, or the lowest rarely as long as the ovary." The lowest bract in one of the specimens that I gathered is slightly more than half an inch longer than the ovary.—WILLIAM W. FLEMYNG, Coolfin, Co. Waterford.

ZOOLOGY.

CRUSTACEA.

Ligia oceanica on the Galway coast.—Mr. R. M. Barrington has obtained a specimen of this isopod on the "Stags of Broadhaven," Co. Mayo. This is the first record for any of the Irish islands, and the second for the west coast. (For description and figure of this species see my paper on the Irish Woodlice in January and February numbers of the IRISH NATURALIST, 1894).—R. S. SCHARFF, Dublin.

INSECTS

Leucophasia sinapis and Melitæa aurinia in the Co. Waterford.—Of the first-mentioned butterfly I was fortunate enough to capture two specimens on the 16th of May. I have never before seen them here. Five years ago, my friend, Mr. R. Reynett, an excellent entomologist, took one specimen here. He has already got seven this year. Of *Melitæa aurinia* I found, on the 26th of last month (April), three larvæ. They were feeding on one of their usual food-plants, viz., *Scabiosa succisa*. Two of them have already (May 22) changed to pupæ.—WILLIAM W. FLEMYNG, Coolfin Rectory, Portlaw, Co. Waterford.

Larvæ of Vanessa atalanta. A correction.—A friend suggests that I should correct a slight error in a note on larvæ of *Vanessa atalanta* in the March number of the IRISH NATURALIST (p. 67). The larvæ referred to as sent in January by me to the Editor of the *Entomologists' Record*, were not found then, but had been reared indoors from about November 1st. I have had *V. atalanta* emerging freely from pupæ up to Christmas, and a few much later; but in no case have I found larva or pupa alive after November 1st, about which time last year we had some heavy hoar frosts, and I do not believe that even in our mild climate it is possible for the butterfly to survive the winter save in the perfect state Pupæ seem more easily destroyed by cold and damp than larvæ, and I found considerable difficulty sometimes in procuring nettles for them through the winter.—JOHN J. WOLFE, Skibbereen, Co. Cork.

Wasps at Bray.—Mr. R. M. Barrington has kindly sent me a lot of queen wasps, as he did last year (IRISH NATURALIST, vol. ii., p. 199). The great majority again prove to be *Vespa vulgaris*; only two *V. rufa* were to be found, while there were fifteen specimens each of the two tree-building species—*V. sylvestris* and *V. norvegica*. I was glad to find eight examples of *V. germanica*, a species not in last year's consignment. The rare *V. arborea*, however, which so agreeably surprised us last year, was not to be found on the present occasion.—GEO. H. CARPENTER.

MOLLUSCS.

Pearl Fishing in the Strule.—In the past week quite a number of valuable pearls were found in the Strule, between Omagh and Newtownstewart. E. Mullan got one weighing ten grains, and for which he refused £10. Thomas Short got six, all good colours and shapes; William Muldoon, nine pearls; J. Donnelly, fourteen, four of which were perfection, and very valuable. The Strule, without exception, is the best river in Ulster for pearls.—*Belfast News-Letter*, 6th June, 1894.

BIRDS.

Long-tailed Ducks in Wexford.—I received about March 24th, an adult pair of Long-tailed Ducks, together with a female Scoter, from a fowler of Wexford Harbour. According to Mr. A. G. Moore (List of Irish Birds, Ed. II., p. 36), the Long-tailed Duck is a "rare winter visitor, in small numbers, chiefly occurring in the North of Ireland."

I have no previous record of its occurrence in the Co. Wexford, except that given in Thompson's "Natural History of Ireland," (vol. iii., p. 141.)—G. E. H. Barrett-Hamilton, Trin. Coll., Cambridge.

The Dusky Shearwater (Puffinus obscurus, Gm.).—Through Mr. Ussher's efforts, the unique Irish specimen of this bird has been secured for the Dublin Museum. Mr. Ussher was good enough to inform me that it flew on board the "Olive" on the 11th May, 1853, near the Bull Rock on the coast of Kerry. It was immediately identified on the island of Valentia by Mr. Bewicke Blackbourn, in whose possession the bird remained until Mr. Ussher induced the owner to present it to the Museum. This identical specimen is figured in Yarrell's British Birds.—R. F. Scharff.

MAMMALS.

The Marten in Co. Donegal.—With reference to Marten in Co. Donegal, I should tell you that I had the remains of one, killed and stuffed by my uncle, the late T. B. Hart, at Glenalla, thirty or forty years ago. So that so far as these woods are concerned, the testimony is more than eyesight and hearsay. The specimen was badly stuffed and subsequently worried by a terrier.—H. C. Hart, Carrablagh, Co. Donegal.

PROCEEDINGS OF IRISH SOCIETIES.

Royal Zoological Society.

Recent donations include two Guinea-Pigs from J. H. Higgins, Esq.; Rabbits from H. G. M'Night, Esq., and T. Williams, Esq.; three Cormorants from Major Murphy; a pair of Cereopsis Geese from General Sir R. Sankey; and a pair of Ravens from S. B. Wilkinson, Esq.

An Orang-outang has been deposited in the gardens by Mr. W. Cross, of Liverpool, so that visitors have now the rare privilege of seeing two of the Anthropid Apes alive in one collection.

About 11,000 persons visited the Gardens in May.

Dublin Microscopical Club.

The Club met at Mr. Greenwood Pim's, who showed specimens of *Æcidium leucospermum* growing on *Anemone coronaria* in his garden. This species is stated by Plowright to be uncommon in the *Æcidium* stage, though the *Puccinia* is abundant. This *Æcidium* occurred last year on the same plants, and Mr. Pim heard of it this season in several quarters. It is a remarkably pretty form, the pendial divisions being white, and the spores golden yellow.

Dr. M'Weeney showed cultivations and a slide of a curious micro-organism isolated by him from purulent matter of a patient suffering from pyelo-nephritis at the Mater Hospital. Cultures in broth at 37°C. develop on the surface a ring of green pigmentation, which, if the depth of the vessel be not great relatively to the surface, gradually extends until the entire fluid is of a brilliant green colour. Young cultures briskly shaken become green throughout, but the colour speedily fades save at the surface. It requires atmospheric air for its development, and, as was pointed out to exhibitor by Professor Hartley, the fading of the colour is due to the reducing action of the living microbes in the deeper strata of the broth. Cultivations of this organism exhale a most peculiar sickly odour which is quite *sui generis*. Injected into animals it produces fatal septicæmia with a sort of emphysematous swelling at the point of subcutaneous inoculation. Morphologically it is a short actively inatile bacillus, with a tendency to stain more intensely at the poles, like the microbe of chicken-cholera. The slide was from peritoneal exudation of a rabbit that had succumbed to inoculation with this microbe which is perhaps identical with that described in *Comptes Rendus* for 1888 by Galtier, under the name of *Bacillus chromo-aromaticus*.

Mr. H. H. Dixon exhibited Overton's Method of fixing and staining minute organisms. This process is carried out by means of a small moist cell in which the material to be fixed is kept in a hanging drop on the under surface of a cover-glass. In this position it may be observed with the highest powers until the stage in which it is desired to fix it is reached. At this moment the cover-glass is raised and a crystal of iodine is introduced into the cell and the cover-glass replaced. The vapour of the iodine fixes the organism, if small, almost instantaneously. The water may now be replaced by some watery stain. Overton recommends the replacing of the water by alcohol, in case other treatment is desired, by exposing the cover-glass, on which the drop of water has been changed for a drop of 20 per cent. alcohol to the vapour of absolute alcohol in a small chamber. In fixing and staining fungi the spores may be sown in a drop of nutritive solution which is thickened by addition of gelatine, so that during the whole process the plants which develop from them remain stationary; also collapse of the cells does not occur when they are transferred into glycerine-jelly.

Dr. J. Joly showed Paraffin casts of the vessels of plants obtained by himself and Mr. H. H. Dixon. In the course of some experiments upon the motion of liquid in plants, they caused cut shoots of lime and elm to draw up melted paraffin of low melting point (45° C.) into the vessels. On cooling and dissolving away the tissues with strong sulphuric acid, paraffin casts (of extreme fineness) of the vessels were isolated. These showed the pits as prominences of various shapes, and faithfully reproduced all the markings upon the walls; spiral, annular, etc. Such casts make very beautiful microscopic objects. The method may be used to determine the lengths of the vessels and their course.

Belfast Naturalists' Field Club.

May 19th.—Excursion to Fair Head and Murlough Bay. A party of about 25 members left Belfast by the 6.30 a.m. train, reaching Ballycastle at 9.30, where breakfast was partaken of. The party then drove to

Lough-na-crannoge, near the summit of Fair Head, and walked along the edge of the stupendous cliffs of the promontory, and past the Grey Man's Path to Murlough Bay, the interesting geological features of which were lucidly explained by Mr. W. A. Traill. The party returned to Ballycastle at 5.0, when tea occupied their attention, and the return journey was accomplished, Belfast being reached at 9.0.

Dublin Naturalists' Field Club.

May 26th.—This Club made the second excursion of their summer session, the place selected being Maynooth. A party of nearly sixty members and visitors proceeded by the 1 o'clock train, and under the guidance of the Rev. T. B. Gibson, B.A., the grounds of Carton, the Duchess of Leinster's beautiful demesne, were entered, and the afternoon was spent along the banks of the Rye water, where the zoologists and botanists found much to interest them, while the florists of the party were much charmed with the "wild gardening" that is carried to such perfection here, and whose beauties were ably demonstrated by Mr. Brown, head gardener, who accompanied the party during the day. The greater part of the demesne is too trim and well-kept to suit the taste of the wild-flower hunter, but some interesting plants were observed, such as *Arenaria trinervia*, which was growing in the greatest abundance; *Geranium lucidum*, *Saxifraga tridactylites*, *Veronica montana*, *Listera ovata*, *Viola hirta*, *Hypericum hirsutum*, *Hippuris vulgaris*. Messrs. H. G. Cuthbert and G. H. Carpenter collected insects, and obtained the following species of Beetles:—*Pterostichus strenuus*, *Anchomenus fuliginosus*, *A. dorsalis*, *A. gracilis*, *Bembidium bruxellense*, *B. flammulatum*, *Melolontha vulgaris*, *Aphodius erraticus*, *A. merdarius*, *Onthophilus striatus*, *Brachypterus urticæ*, *Corymbites cupreus*, *C. quercus*, *Cryptohypnus riparius*, *Telephorus haemorrhoidalis*, *T. pellucidus*, *Rhagonycha limbata*, *Malthodes marginatus*, *Grammoptera ruficornis*, *Donacia bicolora*, *Hydrothassa marginella*, *Longitarsus melano-cephalus*, *Cyphon nitidulus*, *Dasytes ærosus*, *Galerucella tenella*, *Sciaphilus muricatus*, *Phyllobius calcaratus*, *Orchestes fagi*, *O. stigma*, *Cœliodes quadrimaculatus*, *Cionus hortulanus*, *Ceuthorrhynchus litura*, *C. pollinarius*, *Ceuthorrhynchidius troglodytes*, and *Rhinoncus castor*. Among the Hemiptera, *Piezodorus lituratus*, *Tropicoris rufipes*, *Acanthosoma hæmorrhoidale*, *Scolopostethus neglectus*, *Gerris argentata*, *Microvelia pygmæa*, *Lygus pratensis*, var. *campestris*, *Liocoris tripustulatus*, and *Lygus pastinacæ* were obtained. Two Dragon-flies, *Pyrrhosoma minium* and *Enallagma cyathigerum*, and two Lace-wings, *Hemerobius subnebulosus* and *Micromus paganus*, were also captured. At 6 o'clock tea was served by the Misses Gardiner on an open spot backed by fine beech trees, with a beautiful prospect of river and wood in front, after which the members returned to the railway station, some of them taking advantage of a kind invitation to visit Maynooth College, where they saw much that interested and pleased them. The party returned to town by the 8.45 train.

Royal Irish Academy.

June 4th.—Mr. R. J. Ussher read a paper on the Breeding Range of Birds in Ireland. Recent inquiries have shown that the Golden Eagle still breeds in a few spots in Western Mayo, Donegal, Galway, and Kerry. A pair of White tailed Eagles had been seen in the Co. Mayo, and another pair was found in the Co. Kerry. The Peregrine Falcon also breeds in many places throughout the country, but the Common Buzzard is nearly exterminated. The Tree Sparrow was breeding in several parts of Co. Dublin, and was increasing in number. On the other hand, the Raven had become extinct in some counties, and was rare everywhere, while the Bittern is now never met with in our midst.

The Irish Naturalist.

Vol. III. AUGUST, 1894. No. 8.

NOTES ON GLACIAL DEPOSITS IN IRELAND.

BY PROFESSOR W. J. SOLLAS, F.R.S., AND R. LLOYD PRAEGER, B.E.

I.—The Bray River.

The progress in the discovery of the history of the last great glacial period advances like the glaciers themselves—so slowly, that a sceptic might be pardoned for doubting whether any advance is being made at all; nor, considering the extent, complication, and fragmentary nature of glacial deposits, and the number, variety, and contradictoriness of glacial theories, is this in any way surprising. Facts, and the analysis of facts appear to be even still requisite before the subject can be regarded as ripe for synthetic treatment. In the series of notes of which this is the first, we will confine ourselves to a detailed description of the deposits as they are found in some localities in Ireland where we have had an opportunity of studying them, drawing only immediate inferences, and leaving generalization to a later period.

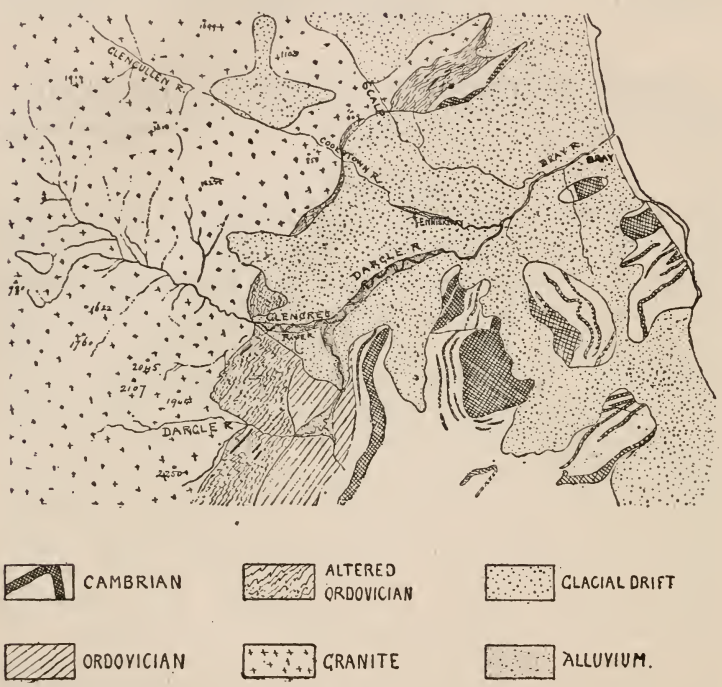
An account has already[1] been given of the succession and character of the glacial deposits as seen in the fine section on the shore between Bray and Killiney; we will now trace their extension inland, availing ourselves of the numerous sections which occur on both sides of the Bray River.

The Bray River, which flows eastward into the Irish Sea some ten miles south of Dublin, is formed by the confluence of the Dargle and Cookstown Rivers, which are made up of numerous tributaries, having their sources among the granite hills (1,000–2,000 feet) of the Leinster chain. Descending from the granite, these feeders flow over Ordovician slates, and micaceous and other schists produced by contact alteration of the slates. The Bray River itself flows chiefly over Cambrian rocks, down a wide valley thickly filled with drift, through which the stream has cut a deep channel. The Carboniferous

[1] *Irish Naturalist*, Vol. III., 1894, pp. 13-18.

rocks, which extend far to the west and north, are completely excluded from its basin by the granite of the Leinster chain. (See Map, fig. 1.)

FIG. 1.



Starting from the sea, we will follow the road to Enniskerry, which runs first on the northern bank of the stream, and for the latter half of its distance on the southern; and study the sections in the order in which we meet them. The first section is seen by the roadside opposite Bray Common. Here the drift presents steep faces some fifteen feet in height, and consists of sandy clay and coarse boulders confusedly intermingled, without stratification, traversed by vertical pipes filled with coarse but otherwise similar material. The stones consist of green diabase, porphyritic with felspar (Lambay porphyry[1]), Leinster granite, and Carboniferous limestone, all

[1] This rock, commonly known as "Lambay porphyry," forms a large part of Lambay Island, fifteen miles N.W. of Dublin, and is common in the Ordovician rocks of Eastern Ireland; near Dublin it occurs in numerous dykes at Glennasmoil.

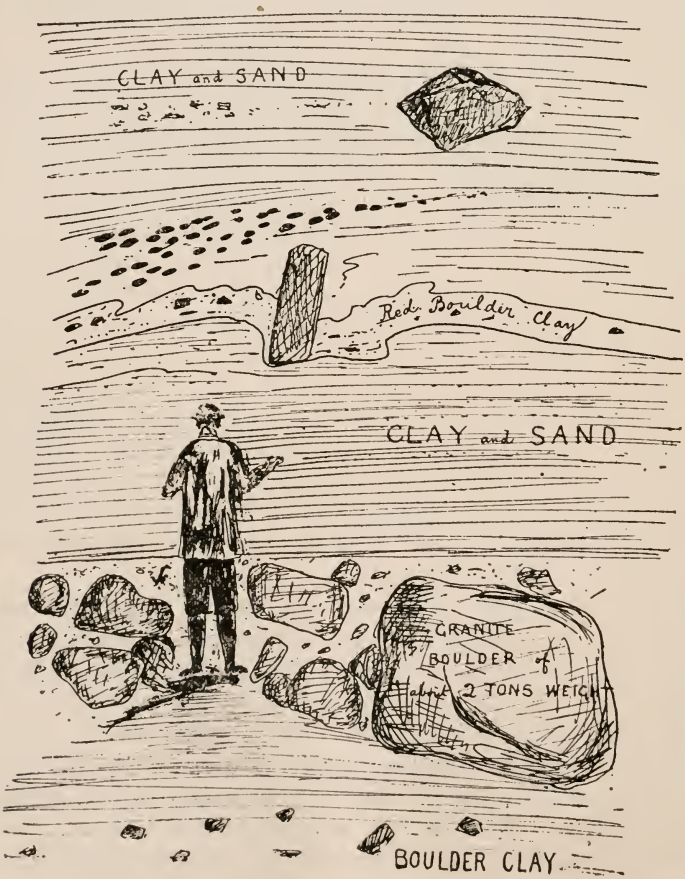
scratched, but usually very irregularly. This deposit appears to correspond to those beds on the shore which we have described under the name of "contorted drift," but which, after further study, we now propose to refer to under the general term of "boulder gravels." In the present section, as elsewhere, the boulder gravels rest on red boulder clay, containing numerous fragments of marine shells, and in all respects similar to the boulder clay on the shore. A little further on, behind some cottages, the boulder clay is seen better; it contains seams of fine red sand free from stones, though in its mass sub-angular and rounded stones of quartzite, Lambay porphyry, Ordovician schist, and Leinster granite are dispersed. Shell-fragments are not uncommon; *Tellina balthica* occurs, and pieces of an exotic *Pecten*.

A good section of the boulder gravels occurs near a cottage before reaching Vallombrosa. Here a massive deposit, twenty feet in thickness, is seen resting on boulder clay, of which some twelve feet is visible. The boulder gravels are cemented together by carbonate of lime, and stand out in a bold cliff over the road. A little further on, behind a cottage on a bye-road, another section is seen, consisting of some twenty feet of coarse, clean gravel. A census of the boulders and pebbles of the deposit gave 50 per cent. Carboniferous limestone, 30 per cent. Cambrian quartzite, 10 per cent. granite; and there were also present basalt, Lambay porphyry, Ordovician ash, flint, slate, and rhyolite, which was identified as coming from Forkill, Co. Armagh. Shell-fragments were found sparingly; *Cyprina islandica* was the only species recognisable. The deposit rests on boulder clay, and a big granite boulder was observed at the junction of the beds. Such boulders commonly occur in such a position.

Following the main road, we now cross the Bray River, and proceed up the southern bank. Opposite where the Vartry water-main crosses the stream, we see a small exposure of blue boulder clay, containing numerous shells, many of them in a nearly perfect state; *Cardium edule*, *Tellina Balthica*, and *Turritella terebra* are common, and there were also observed *Astarte borealis*, *Cardium echinatum*, and fragments of a *Mytilus* and a *Mactra*, and of several indeterminable species. It is worthy of note that the boulder clay at this point is dark blue, whereas almost everywhere else in the Bray valley it is dark

red; further observation is needed before we can speak with certainty as to the significance of these colour-changes. The top of the boulder clay is here about twenty feet above the stream, in which the bed-rock (Ordovician slate) is seen. Over the boulder clay lie forty feet of boulder gravels, containing well striated Carboniferous limestone boulders, the striæ running parallel with the long axis, in the manner characteristic of boulders striated by glaciers. Beside a steep path to a roadside cottage, a band of blue boulder clay, two feet thick, containing well striated boulders of Carboniferous

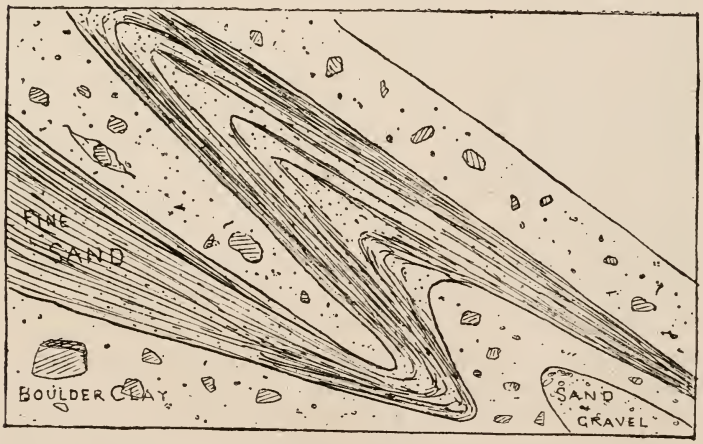
FIG. 2.



limestone, and shells of some of the species last mentioned, a few of them perfect, but only as single valves, is seen intercalated in the boulder gravels, with fine sands above and below it. The boulder gravels contain huge fragments of granite and Cambrian slate. Similar intercalations are seen elsewhere.

A little further on, at a bend of the road, a very remarkable section is seen, as shown on accompanying sketch (fig. 2). Immediately above the boulder clay are great blocks of granite, ranging up to about two tons in weight. Clays and sands succeed, and on their irregular surface lies a contorted layer of characteristic red boulder clay, eight inches thick, followed by pebble beds, sands, and clays in alternation. A little further on the boulder clay underlying this layer of great boulders is exposed for a depth of fifteen feet; it is red in colour, shell-fragments are common in it, as well as fragments of Antrim chalk, and well striated Carboniferous limestone.

Fig. 3.



Apparent folding in the Glacial Drift, Bray River, near Enniskerry. The crests of the folds point up the river valley. Length of section about 15 feet.

A few yards further on, in a cutting made for the proposed Enniskerry railway, the section seen in figure 3 is observed; this appearance is remarkably suggestive of folding, though the inclusion in the boulder gravels of lenticular masses of

boulder clay, such as may be seen in the coast section, might possibly give rise to the same effect.

Near the road, within a stone's throw of Enniskerry, occurs by far the finest section which is to be seen in the valley, and of decidedly unusual character. Here the boulder clay, of which only the upper surface is exposed, is seen underlying about seventy feet of sands and gravels. The boulder clay contains fragments of shells as usual; it is succeeded by a curious alternation of boulder clay and gravelly beds, so that the lowest portion of the section is as follows:—

	Feet.	Ins.
Red-brown boulder clay, . . .	1	0
Laminated sand, ...	1	0
Limestone gravel, ...	0	3
Red-brown boulder clay, ...	1	0
Laminated sand, ...	1	0
Limestone gravel, ...	0	6
Top of thick deposit of boulder clay.		

In the intercalated clay shell-fragments occur, and in the beds of gravel *Astarte compressa* was found, with fragments of two other shells. Attention may be called to the regular gradation from gravels through sands to boulder clay, and, as thin beds of boulder clay rest quite undisturbed on evenly laminated sands, it would be an obvious suggestion, were we dealing with any other than glacial deposits, that the whole were of aqueous origin. The section is continued upwards into varying beds of sand, frequently micaceous, some finely laminated, some false-bedded; sandy and clayey gravels, and pebble beds, composed of Carboniferous limestone and granite; the several beds varying in thickness from one inch to two feet. The whole concludes above with a massive band of brown sandy clay, full of rounded, sub-angular, and angular pebbles and boulders chiefly of Carboniferous limestone, irregularly scratched. This section contrasts strongly with the other exposures of boulder gravels in the extreme cleanness of the sands and gravels, and the apparent total absence of shell-fragments above the last bed of boulder clay, *i.e.*, in the greater portion of the deposit.

(TO BE CONCLUDED.)

A BOTANICAL TRIP TO CO. ANTRIM.

BY W. A. SHOOLBRED, M.R.C.S., CHEPSTOW.

(*Concluded from page* 149.)

Lythrum salicaria, L.—I do not recollect ever before having seen this plant forming such grand masses of colour as it did last summer, especially in Glenariffe and Glendun. The flowers were brighter in colour than usual, no doubt in consequence of the unusual duration of bright sunlight.

Epilobium palustre, L.—Glenariffe, Glendun, Fair Head, Causeway, &c.

E. obscurum x palustre (Teste E. S. Marshall).—Glenariffe, Glenshesk, and Giant's Causeway.

Circœa alpina, L.—Glenariffe.
var. **intermedia** (Ehr.)—Glenariffe and Glenshesk.

Galium boreale, L.—Sparingly by the stream in the upper part of Glenariffe.

Valeriana officinalis, L.—Common, but only var. *Mikanii* noticed.

Centranthus ruber, DC.—Wall near Ballycastle.

Gnaphalium sylvaticum, L.—Glenariffe, sparingly.

Chrysanthemum segetum, L.—Extremely common in tillage fields, while field poppies appear to be equally rare. In this part of the West of England *C. segetum* is a decidedly rare plant.

Matricaria inodora, L. b. **salina**, Bab.—Giant's Causeway, &c.; c. **maritima**, Linn.—Red Bay.

Arctium nemorosum, Lej.—Fair Head.

Crepis paludosa, Moench.—Glendun.

Hieracium anglicum, Fr.—Frequent on the cliffs along the coast; Fair Head, cliffs at Giant's Causeway, Co. Antrim; Benevenagh, Co. Derry.

This and *H. iricum* appear to grow more abundantly at quite low elevations in County Antrim than is usually the case in West Scotland. The plants, too, growing at these low elevations are generally very luxuriant with flower stems much branched and numerous heads of flowers. Near Garron Head, at a few feet above sea-level, some very large specimens were gathered, and near the bridge over the Cushenilt Burn one with a single much-branched flower-stem bearing forty flower-heads in all stages of development. Of this Mr. Hanbury writes "*H. anglicum*, Fr. form." These plants have a very different appearance from the ordinary two- or three-headed highland forms.

A plant from a bank by the Parkmore road on the north side of Glenariffe, of which Mr. Hanbury writes, "I think only a form of *H. anglicum* grown in a dry exposed place," looked, when gathered, very unlike this species, the root-leaves forming a close flat rosette, from almost orbicular to ovate, nearly entire, very shortly petioled, very glaucous, coreaceous, and bearing on their surface numerous stiff white hairs. No stem-leaf. Stem one-headed with a few abortive buds in the axils of linear bracts. The involucre less hairy and rather more floccose than in most forms of *anglicum*.

Another from Sallagh Braes, which Mr. Hanbury also considers a form of *anglicum*, has thin long-petioled root-leaves very deeply and acutely dentate in the lower half, teeth patent; stem-leaf none, or one narrow, sessile, and quite low down; heads one to three.

On the Giant's Causeway cliffs a form with purple-spotted leaves was found, very similar to a form seen a week or two later in Perthshire.

var. **longibracteatum,** Hanb.—Basalt cliffs on the south side of Glenariffe. Plants apparently the same, but too far advanced for identification, were gathered on Sallagh Braes and near Garron Head.

H. iricum, Fr.—Very fine on the cliffs near Garron Head. Plentiful on the cliffs and by the river in the upper part of Glenariffe.

H. bifidum, Tausch.—Basalt cliffs, Benevenagh, Co. Derry. Only three or four specimens collected and a few more seen quite out of reach. Foliage apparently of this seen on Sallagh Braes, but flowering stems quite dead.

H. euprepes, Hanb.—Boulder-clay bank by roadside near Milltown, Red Bay.

H. stenolepis, Lindeb.—Plentiful on the cliffs near Garron Head; Glenariffe cliffs, Co. Antrim. Benevenagh; Co. Derry.

H. murorum, Linn.—Glenariffe, not yet out of flower in shady places by the river; cliffs near Garron Head, &c.

H. vulgatum, Fr.—Cliffs near Garron Head; plentiful in Glenarifte and Glendun, both on the higher parts of the cliffs and by the streams.

H. Friesii, Lindeb.—Riverbanks, Glendun.

H. auratum, Fr.—In several places on the banks of the river in Glendun.

H. crocatum, Fr.—Cave Hill; boulder-clay bank near Milltown, together with *euprepes* and *vulgatum*; Glendun.

H. eupatorium, Fr.—Riverbanks, Glendun.

Hypochæris radicata, L.—A form gathered on the cliffs at Benevenagh, in foliage and habit somewhat resembling *H. maculata.*

Sonchus arvensis, L.—Remarkably finely developed plants about the bases of sea-cliffs near Giant's Causeway.

Lysimachia nemorum, L.—A luxuriant form with flowers much larger than is usual with us, was noticed in the Glens.

Erythræa centaurium, Pers., var. **capitata** (Koch.)—Sand-banks near Giant's Causeway.

Myosotis palustris, With., var. **strigulosa** (Reichb.)—Cushendun.

Euphrasia officinalis, L., var. **gracilis** (Fr.)—Between Ballyearth and Ballintoy.

Bartsia officinalis, Huds., var. **serotina** Reichb.—Giant's Causeway, &c.

Melampyrum pratense, L.—Both vars. **latifolium** and **montanum** noticed in the glens.

Rhinanthus Crista-galli, L., var. **angustifolia**—Fair Head.

Lamium intermedium, Fr.—Fields near Giant's Causeway.

Salsola kali, L.—Red Bay.

Atriplex laciniata, L.—Red Bay.

Betula glutinosa, Fr., and var. **pubescens** (Walh.)—Glenariffe and Glendun.

Habenaria conopsea, Benth.—Fair Head.

H. albida, R. Br.—Glenariffe.

H. chloroleuca, Ridley—Glenariffe.

Scirpus setaceus, L.—Near Fair Head; between Ballycastle and Ballintoy.

Carex pilulifera, L.—Glenariffe cliffs.

C. pendula, Huds.—Glenariffe.

Sieglingia decumbens, Bernh.—Cliff bases, Glenariffe.

Festuca duriuscula, L.—Glenariffe.

Agropyron acutum, R. & S.—Sandy shore, Red Bay.

A. marinum, L.—Benevenagh cliffs, Co. Derry.

Cystopteris fragilis, Bernh.—Sparingly on Benevenagh cliffs.

Polystichum lobatum, Presl and var. **aculeatum** Syme.—Glenariffe and Glendun.

Lastrea Filix-mas, L.—Some enormous specimens noticed in Glenariffe with fronds nearly five feet in length.

Botrychium Lunaria, Sw.—There was not a frond of this to be seen at Cushendun on the sandy ground near the shore where Mr. Brenan told me it can usually be found in hundreds. The long drought had probably shortened the season of growth for this as well as for so many other herbaceous plants.

HYDROIDS AND POLYZOA COLLECTED BETWEEN LAYTOWN AND THE MOUTH OF THE BOYNE.

BY J. E. DUERDEN, A.R.C.SC. (LOND.)

THE material upon which the following report is based, was collected along the shore from Laytown to the mouth of the River Boyne, a distance of about three miles, on the occasion of the visit of the Dublin Naturalists' Field Club on the 16th June, 1894. Except at the mouth of the Boyne the shore is one stretch of sand, there being none of the rock-pools which generally reward the collector of zoophytes so liberally. In all twenty-three species of Hydroids and twenty species of Polyzoa were obtained, which had been washed up from more or less considerable depths. Two of the Hydroids, *Gonothyræa hyalina*, Hincks, and *Sertularia gracilis*, Hassall, are new to Ireland. Of the former a fine colony was found growing profusely on *Zostera*, and exhibiting the characteristic irregularly ovate gonothecæ. It is a rather rare hydroid, and is mentioned by Mr. Hincks (Brit. Hyd. Zooph., p. 185) only from Shetland, amongst British localities. *Sertularia gracilis* is closely allied to the very common *S. pumila*, Linn., but is much more delicate in all its parts, and is not exclusively littoral.

Diphasia attenuata, Hincks, and *Plumularia similis*, Hincks, were collected. They are rather rare forms, each having been previously recorded from only two Irish localities.

At the mouth of the Boyne a few rock-pools are found, and the water is slightly brackish. *Obelia gelatinosa*, Pallas, was obtained, and *Campanularia flexuosa*, Hincks, was abundant on the under side of the stones.

Amongst the Polyzoa *Cellepora avicularis* Hincks, was obtained in great abundance encrusting *Hydrallmania falcata*, Linn., and other zoophytes. So far this species has been recorded in Ireland only from the coast of Antrim, but, as Hincks says, it has probably been passed over from its superficial resemblance to the common *Cellepora pumicosa*, Linn.

As no collections have ever been previously recorded from this district I give below the entire list of those obtained.

HYDROIDS.

Eudendrium ramosum, Linn. *Clytia johnstoni*, Alder. *Obelia geniculata*, Linn. *Obelia gelatinosa*, Pallas. *Obelia dichotoma*, Linn. *Campanularia volubilis*, Linn. *Campanularia verticillata*, Linn. *Campanularia flexuosa*, Hincks. *Gonothyræa hyalina*, Hincks, new to Ireland. *Lafœa dumosa*, Flem. *Calycella syringa*, Linn. *Coppinia arcta*, Dalyell. *Halecium Beanii*, Johnston. *Sertularella polyzonias*, Linn. *Diphasia attenuata*, Hincks. *Sertularia gracilis*, Hass., new to Ireland. *Sertularia operculata*, Linn. *Sertularia abietina*, Linn. *Sertularia argentea*, Ell. and Sol. *Hydrallmania falcata*, Linn. *Antennularia ramosa*, Linn. *Aglaophenia pluma*, Linn. *Plumularia similis*, Hincks.

POLYZOA.

Eucratea chelata, Linn. *Gemellaria loricata*, Linn. *Scrupocellaria reptans*, Linn. *Scrupocellaria scruposa*, Linn., very abundant on *Fucus*. *Cellaria sinuosa*, Hass. *Membranipora pilosa*, Pall. *Membranipora membranacea*, Linn. *Schizoporella hyalina*, Linn. *Cellepora pumicosa*, Linn, *Cellepora avicularis*, Hincks. *Crisia eburnea*, Linn., with abundant ovicells. *Crisia aculeata*, Hass. *Tubulipora flabellaris*, Fabr. *Idmonea serpens*, Linn. *Lichenopora hispida*, Flem. *Alcyonidium parasiticum*, Flem. *Vesicularia spinosa*, Linn. *Amathia lendigera*, Linn. *Bowerbankia imbricata*, Johnst. *Valkeria uva*, Linn.

INSECTS COLLECTED BY THE ROYAL IRISH ACADEMY FLORA AND FAUNA COMMITTEE, 1893.

BY REV. W. F. JOHNSON, M.A., F.E.S., J. N. HALBERT, and GEORGE H. CARPENTER, B.SC.

COLEOPTERA.

(*Concluded from page* 155.)

CHRYSOMELIDÆ.

Donacia discolor, Panz.—Berehaven; Bere Island; Hungry Hill. The only other record for Ireland is Ardara, Co. Donegal, but specimens have been obtained (besides the localities just mentioned) at Killarney (July, 1892), Leixlip, and the Royal Canal, near Dublin. We doubt, however, if this form should be considered distinct from *D. sericea*.

Lema lichenis, Voet.—Cavan, common in moss on trees.

Chrysomela Banksi, F.—Coolmore.

C. staphylea, L.—Cavan, common.

C. hyperici, Forst.—Near Ballyhaise, in moss.

Gastroidea viridula, De G.—Shores of Lough Oughter, sweeping nettles.

G. polygoni, L.—Greenore, common in a meadow.

Phædon tumidulus, Germ.—Dundalk.

P. armoraciæ, L.—Coolmore.

Prasocuris junci, Brahm.—Dundalk.

Lochmæa capreæ, L.—Hungry Hill. New to the south-west of Ireland.

L. suturalis, Thoms.—Fathom, off conifers. Shores of Lough Oughter.

Galerucella lineola, F.—Berehaven, new to S. W. Ireland.

Adimonia tanaceti, L.—Coolmore, great numbers washed on the beach after a very hot day.

Longitarsus ater, F.—Ballyhaise.

L. luridus, Scop.—Cavan, common.

***L. suturellus,** Duft., var. **fuscicollis,** Steph.—Cultragh Lough.

L. melanocephalus, All.—Coolmore. Cavan, common.

***L. distinguendus,** Rye.—Coolmore.

L. jacobææ, Wat.—Coolmore. Cavan, common.

L. gracilis, Kuts.—Coolmore. Cultragh Lough.

Haltica ericeti, All.—Shores of Lough Oughter, one specimen by sweeping in a birch plantation. A new species to the North of Ireland. The only other Irish locality recorded is Waterford.

Phyllotreta undulata, Kuts.—Coolmore. Cavan, common.

Sphæroderma cardui, Gyll.—Coolmore.

Crepidodera transversa, Marsh.
C. ferruginea, Scop. } Coolmore. Dundalk.

C. ventralis, Ill.—Coolmore.

Plectroscelis concinna, Marsh.—Cavan, common.

Psylliodes chrysocephala, L.—Ballyhaise.

P. napi, Koch.—Banks of River Erne near Ballyshannon. Ballyhaise.

Cassida viridis, F.—Dundalk.

MORDELLIDÆ.

Anaspis frontalis, L.—Fathom.

CURCULIONIDÆ.

Apion subulatum, Kirby.—Ballyhaise.

A. cruentalum, Welt.—Woods near Cultragh Lough.

A. rufirostre, F.—Coolmore.

A. viciæ, Payk.
A. apricans, Herbst. } Coolmore. Cavan, common.
A. bohemani, Thoms.

A. dichroum, Bedel.—Woods near Cultragh Lough.

A. carduorum, Kirby.—Shores of Lough Oughter.

A. virens, Herbst.—Coolmore. Cavan, common.

A. ervi, Kirby.—Cavan, common.

A. vorax, Herbst.—Coolmore.

A. Gyllenhali, Kirby.—Coolmore. Cavan, common.

A. seniculum, Kirby.—Carlingford. The only other Irish locality recorded is Waterford.

*Apion marchicum, Herbst.—One specimen at Cultragh Lough.

A. humile, Germ.—Coolmore.

Otiorrhynchus atroapterus, De G.—Coolmore.

O. maurus, Gyll.—Carlingford.

O. ligneus, Ol.—Coolmore.

O. picipes, F.—Carlingford. Fathom. Berehaven.

O. sulcatus, F.—Coolmore. Fathom. Berehaven. Dursey.

O. rugifrons, Gyll.—Coolmore.

Strophosomus coryli, F.—Cavan. Berehaven.

Liophlœus nubilus, F.—Berehaven.

Barynotus Schönherri, Zett.—Coolmore. Slieve Gullion.

Alophus triguttatus, F.—Coolmore.

*Sitones cambricus, Steph.—Shores of Lough Oughter, sweeping *Phragmites* at water's edge.

S. regensteinensis, Herbst.—Cavan, common. Dundalk.

S. tibialis, Herbst.—Coolmore. Cavan.

S. hispidulus, F.—Cavan.

S. flavescens, Marsh.—Coolmore. Lough Oughter. Slieve Glah.

S. sulcifrons, Thunb.—Coolmore. Cavan.

Hypera polygoni, L.—Greenore. Dundalk.

H. plantaginis, De G.—Coolmore.

H. nigrirostris, F.—Slieve Gullion.

Hylobius abietis, L.—Berehaven.

Orchestes fagi, L.—Cavan, common.

Rhamphus flavicornis, Clairv.—Coolmore.

Erirrhinus scirpi, F.—Coolmore, not common. Lough Oughter, very local, several specimens on a patch of *Scirpus* on the shore.

E. acridulus, L.—Dundalk.

Mecinus pyraster, Herbst.
Anthonomus pedicularius, L. } Coolmore.

Nanophyes lythri, F.—Coolmore, on *Lythrum salicaria.*

Cœliodes quadrimaculatus, L.—Coolmore. Dundalk. Cavan, very common.

Ceuthorrhynchus erysimi, F.—Woods near Cultragh Lough.

C. contractus, Marsh.—Coolmore.

C. pollinarius, Forst.—Coolmore. Cavan, common.

C. litura, F.—Coolmore, abundant on thistles. Mr. Halbert has taken it at several localities in Co. Dublin, but does not seem to have recorded the capture.

Rhopalomesites Tardyi, Curt.—Coolmore. Bantry. Killarney.

THE SEAGULL BOG, TULLAMORE.

BY R. LLOYD PRAEGER, B.E.

By the kindness of the Rev. Canon Russell, of Geashill Rectory, I had recently an opportunity of visiting a portion of the Bog of Allen, including that bog, a few miles south of Tullamore, which is celebrated as being one of the greatest breeding-haunts of the Black-headed Gull (*Larus ridibundus*, L.) in Ireland—if, indeed, it is not *the* greatest. A morning train on June 23rd speedily brought me to Geashill station, and a rapid drive to the rectory, along a pine-fringed road, with bog stretching away on either hand, only left time to note the Bog Thistle (*Carduus pratensis*) filling a meadow by the railway between Portarlington and Geashill, and the Rough Hawksbeard (*Crepis biennis*) growing in abundance in the meadow around the school-house in the little village; I was informed that it has been abundant in this meadow for some years. This plant, probably in all cases originally introduced with grass-seed, appears to be spreading in Ireland; but it is still local and rare. The forenoon was spent in Canon Russell's company in exploring the bog lying between the rectory and the railway. On the way thither I was pointed out a meadow which is the only local habitat of the Bee Orchis (*Ophrys apifera*), and here we obtained good specimens in full blossom. Out on the bog the Marsh Andromeda (*A. polifolia*) was abundant, as I was told it is on all the neighbouring bogs, but its pretty pink bells were all already fallen; in the wetter portions, especially on the margins of pools, the beautiful little Cranberry (*Vaccinium Oxycoccos*) was in full blossom, and the great tufts of soft green *Sphagnum*, covered with a network of its wiry little stems with reflexed white-backed leaves, and dotted all over with its pink flowers, were indeed a sight to see. Here also grew two of the Sundews (*Drosera anglica* and *D. rotundifolia*), and other bog plants. On our return to the rectory *Arenaria trinervia* was observed growing close to the house. Early in the afternoon we started for the "Seagull Bog," a pleasant drive of some miles along roads with great hedges filled with the Dog Rose and Trailing Rose (*R. arvensis*) and Honeysuckle and Guelder Rose in great abundance. In more than one spot I observed the Alder Buckthorn (*Rhamnus Frangula*) which Canon Russell had

previously found in other hedges in the district. Arrived at the edge of the bog we were joined by Mr. Digby, J.P., agent to his cousin, Lord Digby, the owner of the estate, under whose care the "gulleries" are carefully preserved, and have in consequence enormously increased in size of late years—a wise as well as humane act of protection, for these birds are of great service to the farmer, and destroy hundreds of grubs and worms, and their appearance should be welcomed by the agriculturist everywhere. Our party having been reinforced by several ladies, we passed through a couple of fields to where the bog rose in front of us. I use the word "rose" advisedly, for, like many of the larger Irish bogs, it rises, at first quite suddenly, and then in a long smooth ascent, from the margin to the centre, a distance of over half a mile. It is in the central portion, where the bog is intersected by a maze of pools and dangerous quagmires, that the gulls have made their great colonies, and thither we were piloted under the skilful guidance of Mr. Digby, who appeared acquainted with every pool and tuft of heather of the whole region. This pilotage was indeed necessary, for danger lurks in the bewildering network of water and soft moss that stretches on every hand, and ere we left, several of our party had learned, by little bits of personal experience more surprising than pleasant, the reason why this bog is feared even by the hardy and experienced cottagers around its margins.

We were of course too late to see the eggs of the Black-heads, and already the majority of the young birds were able to fly; but as we advanced into the centre of the breeding-ground, and as hundreds upon hundreds of gulls rose as we cautiously wended our way onward, we saw dozens of deserted nests, and soon came on plenty of young birds running like rats among the rushes and grass, or skulking in corners of the pools; while all the time continued the musical din caused by the cries of hundreds of gulls. To watch the myriads of graceful birds eddying overhead, and to listen to the wonderful clamour, was most interesting; but, on botanical things intent, what struck me most was the curious and abrupt change in the character of the vegetation on those portions of the bog which the gulls had selected as breeding-haunts. Outside of this area the usual bog-flora reigned—Ling (*Calluna vulgaris*), Bog Heather (*Erica tetralix*), *Scirpus cæspitosus* and

Sphagnum making up the bulk of the vegetation, assisted by Andromeda, Cranberry, Cotton-grass, and the two Sundews previously mentioned. But where the gulls have settled an abrupt change is noticeable. All the above plants disappear, and they are replaced by dense and luxuriant beds of rushes (*J. effusus* and *J. acutiflorus*), Sorrel (*Rumex acetosa*), and Soft-grass (*Holcus lanatus*), among which grow many plants which do not normally affect the centre of an extensive and very wet bog, such as the Chickweed (*Stellaria media*), Heath Groundsel (*Senecio sylvaticus*), Rape (*Brassica Napus*), Creeping Crowfoot (*Ranunculus repens*), Pearlwort (*Sagina procumbens*), Broad-leaved Mouse-ear (*Cerastium glomeratum*), Small-flowered Willow-herb (*Epilobium parviflorum*), and so on. That the original flora is killed off by the continued trampling, and by the accumulation of guano, there can be no doubt; while other stronger plants which love wet manured ground, and others again whose seeds have been eaten by the birds, spring up to take their place. It was late in the afternoon ere we again reached the edge of the bog, and drove back to the hospitable rectory at Geashill, where a few botanical notes were gleaned from Canon Russell and his sisters, such as the occurrence of the Toothwort (*Lathræa squamaria*) in some abundance not far off, and of the Columbine (*Aquilegia vulgaris*) in Clonad Wood, where it is thoroughly naturalized, if not native; I was shown specimens of the Fly Orchis (*Ophrys muscifera*) collected in the county. An evening drive to the station, and a couple of hours train journey in pleasant company, completed a most interesting day, made doubly enjoyable by the kindly hospitality that was extended to me.

NOTES.

ZOOLOGY.

INSECTS

Deilephila livornica in Co. Meath.—On Sunday, June 10th, 1894, about 9.45 p.m., I took on the wing, near a clump of rocket plants in bloom, in the garden of Riverston, Trim, Co. Meath, a fine fresh specimen of this handsome hawk-moth. The insect was flying with the wind, which was blowing pretty sharply from about north-north-east.—Louisa E. Cuppage, Riverston, Trim.

[It appears from the catalogue of the Lepidoptera of Ireland by Mr. W. F. de Vismes Kane, now being published in *The Entomologist*, that there are records of captures of this insect on six or seven previous occasions in Ireland. The number of specimens taken before the present are amounting in all to twelve—*i.e.*, two at Youghal, two at Ennis, and

one at Kilkenny (dates not given), four at Killarney in 1864, and one at Kingstown, and two near Belfast in 1888. The Dublin Museum possesses a specimen labelled "Kildare, Douglas, 1869." It is to be observed that the year 1888, like the present year, followed an unusually hot dry season.—EDS.]

Bupalus piniaria and Eupithecia togata in co. Meath.—This week, when beating for moths in Mr. Winter's charming bog wood, Agher, Co. Meath, I had the pleasure of capturing some specimens of *Bupalus piniaria*, a rare and local species in Ireland. At the same time and place I took two fine and fresh specimens of *Eupithecia togata*.—HARRIETTE E. REYNELL, Dublin.

Cimbex connata, Schr., on Valentia.—A female of this scarce and handsome sawfly has been kindly forwarded to the Dublin Museum by Miss Delap.

Mr. J. J. Dowling has taken two male Cimbices of extraordinary size at Stillorgan, Co. Dublin. I am not yet satisfied if they are also *C. connata*; they may prove to be an American species.—GEO. H. CARPENTER.

Micralymma brevipenne, Gyll., at Mornington, Co. Meath.—It was my good fortune to be present at the recent joint excursion of the Dublin and Belfast Field Clubs to the district south of the Boyne mouth; quite a number of good species were taken. Of special interest to me was *Micralymma brevipenne*, Gyll., which I obtained in some numbers under stones where a small streamlet flows into the Boyne near Mornington. I had also taken it in the Dingle district earlier in the month. Little is known about the occurrence of this species in Ireland; there is no Irish locality given in Canon Fowler's recent work on the British Coleoptera, but on making search I find that there are specimens in the Haliday collection from Strangford Lough, and he also recorded it from the Creek of the Owenbeg River, Co. Cork.—J. N. HALBERT, Dublin.

MOLLUSCA.

The Common Mussel (Mytilus edulis).—Mr. R. Lloyd Patterson's mention of the mussel industry in Belfast Lough, and the fact that they had shifted their quarters, reminds me that last year I noticed a sudden increase of young mussels on the shore about Macedon Point, where many square yards of ground are thickly covered with them, and this year, for the first time in my memory, boats have been fishing for them with long rakes as he describes, and a donkey cart and hand-carts have been gathering those close to the shore.—SYDNEY M. THOMPSON, Belfast.

BIRDS.

Redstart (Ruticilla phœnicurus), breeding in Co. Tyrone.—On the 16th June inst., I visited Barons Court, the extensive and beautifully wooded demesne of the Duke of Abercorn, where an abundance of fine old timber covers the hill slopes. In reply to my enquiries as to the birds to be found there, Mr. James Maclean, the under-keeper, stated that Redstarts had bred there three years in succession since he came to the place, and he showed me holes in trees in which they had nested. He then showed me the male and female Redstarts and found their nest of this year containing three young just ready to fly, and three eggs that had not hatched out. A fourth young Redstart that had left the nest was caught, and is now in the Science and Art Museum. The nest was in the hole of a broken branch of a large old birch. The parent Redstarts remained near when we were inspecting it, uttering their alarm-cry like the "twit" of a Willow Warbler, but much louder. The male was a splendid bird, forehead white, face and throat black, back bluish grey, breast and tail bright orange.

The Rev. G. W. Peacocke informs me that on the 26th and 29th May, 1888, he saw and heard a male Redstart which he found frequenting Rash

Wood in Co. Tyrone. He accurately described the bird, with which he was acquainted in England previously.

Hitherto the Redstart has only been recorded since 1885 as breeding in Ireland at Powerscourt, so that these discoveries of it, both in the same part of the Co. Tyrone, are unexpected.—R. J. USSHER, Cappagh.

Blackcap (Sylvia atricapilla) in Co. Meath.—The Blackcap is not mentioned as nesting in County Meath in the table of "Irish Breeding Birds," compiled recently by Mr. Ussher, and I am not aware that it has been elsewhere recorded as occurring in Meath; but there can be little doubt of its nesting in the county when it is found there in full song on such a date as June 22nd. On that day I heard two different birds of this species in full song in the woods of Slane Castle demesne, and another in the woods of Beauparc. All three were within a mile of each other.—J. E. PALMER, Dublin.

Birds at Cushendun, Co. Antrim.—I have to record the capture of a young white Rook, at Cushendun, in May. The Spring Migrants appeared as follows:—Swallows on April 1st, the Cuckoo on the 7th, and the Corncrake on the 16th.—S. A. BRENAN, Knocknacarry, County Antrim.

The Quail (Coturnix communis) in Co. Wexford.—With reference to some notes which appeared in the *Irish Naturalist* about this time last year anent the Quail, I beg to say that I listened for some time to a Quail calling in this county on the 20th July. I have not had a nest for over 30 years.—W. MACMILLAN.

PROCEEDINGS OF IRISH SOCIETIES.

MUSEUMS ASSOCIATION.

This young but important body selected Dublin as the place for its fifth annual meeting, and over thirty delegates and associates from England and Scotland attended the gathering held here during the last week in June. Much interest was taken by the scientific public of Dublin in the meeting, and the number of local members equalled that of the visitors from across the Channel. Dr. V. BALL, C.B., F.R.S., Director of the Science and Art Museum, was president. Naturally the staff of that Institution were well represented at the meetings, and Mr. S. A. Stewart, the veteran curator of the Belfast Museum, was also present. Even America was represented by Dr. Talmage of Salt Lake City. Dr. Scharff and Mr. Longfield acted as local secretaries and spared no pains to make the meeting successful and pleasant.

JUNE 26th.—On the morning of this day the English and Scotch members arrived in Dublin. In the afternoon visits were paid to the Botanic and Zoological Gardens, tea being provided at the latter. The party were shown round the gardens and glass-houses at Glasnevin by Mr. F. W. Moore; the orchid-houses and the Killarney-fern house specially pleased the visitors. At Phœnix Park, Dr. Gordon, President of the Royal Zoological Society, received the members and conducted them to the various houses; the Orang and Chimpanzee, and the splendid collection of large carnivora were much admired.

In the evening, the meeting was formally opened in the house of the Royal Irish Academy, when Dr. BALL delivered his presidential address. This discourse on the Museums of Dublin is printed in full in *Natural Science* for July. In it, Dr. Ball traces the history of the various bodies in Dublin which have acquired collections, and shows how the majority of these, entirely or in part, have contributed to the formation of the national institution in Kildare-street. Special attention is naturally directed to the splendid collection of Irish antiquities formed by the

Royal Irish Academy, and to the natural history and other specimens in the old Museum of the Royal Dublin Society. The history of the steps leading to the transfer of these to the Science and Art Department in 1877 is traced at length, and the main points in the development of the Museum up to the present day are sketched, the removal of the art collections to the new buildings in 1890 being specially dwelt upon.

A vote of thanks to Dr. Ball for his address was moved by the LORD MAYOR, and seconded by Dr. INGRAM, the latter expressing a hope that the visitors might both receive and impart information during their stay in Dublin. The Lord Mayor then invited the members to spend an hour at the Mansion House, which they did with much pleasure.

JUNE 27th.—The reading of papers commenced at Leinster House. Mr. W. B. PEARSALL, F.R.C.S.I., described a "New Method of mounting and arranging Dental Specimens and Casts." A tooth is cemented to a fine wire inserted in the stopper of a glass tube, so that it can be readily inspected from all sides. In the discussion which followed, the opinion was expressed that this mounting would be suitable for such natural history objects as small shells.

Mr. H. B. WHITE, M.A, gave "A Description of certain of the Fittings and Appliances in use in the Science and Art Museum, Dublin," comprising the cases and systems of shelving in the various departments. Special attention was drawn to Mr. De Sales' patent hinge by means of which two doors can be hung back to back without an intermediate style.

Mr. F. W. RUDLER, F.G.S., read a paper "On the Arrangement of a Mineral Collection." He suggested that, in a small museum, the minerals are better arranged by their bases, so as to bring together the ores of the same metal, than by their acid constituents in accordance with the most recent scientific classification; the arrangement by bases being more useful to miners and practical men. Where there is a large collection, scientifically arranged, there should be subsidiary series, illustrating metallic ores, precious stones, &c. This paper led to an interesting discussion, some of the members advocating a strictly scientific arrangement, while others thought (with Mr. Rudler) that the popular and practical applications of the subject should receive most attention.

Mr. J. PATON, F.L.S., of Kelvingrove Museum, Glasgow, gave a suggestive and humourous paper upon "The Education of a Curator." He contrasted the old with the modern idea of a museum, and pointed out with many illustrations how the curator of the present day is expected to be an adept in all arts and sciences. His comparison of the modern specialist to "an unicellular organism" specially amused the meeting. He advocated a system of apprenticeship in museum work for which preparation should be made by a sound general education, specially in English, modern languages, drawing, and natural and physical science.

Mr. G. H. CARPENTER gave an account of the "Collections to illustrate the Evolution and Geographical Distribution of Animals," which he has arranged in the Dublin Museum. The geographical collection is to be found along the south and west walls of the ground floor of the Natural History building and illustrates by means of characteristic specimens, maps, and descriptive labels, the general principles of distribution, and the fauna of the six zoological regions of Sclater and Wallace. The series to illustrate evolution is arranged in a wall case at the eastern end of the same room, and shows by specimens, diagrams, and labels some of the main facts of animal life and structure which have led naturalists to belief in the doctrine of descent.

A paper by Mr. J. M. CAMPBELL, of Glasgow, on co-operative collecting was read by Mr. Paton. The author suggested that a number of museums should club together to support a collector, and divide the results of his work. In the discussion which followed, the opinion that

the division of the spoils would not be amicable, was put forth by several; and a medium for advertising duplicates available for exchange was strongly advocated.

In the early part of the afternoon visits were paid to the National Gallery, and the museums of the Royal College of Surgeons and Royal College of Science, the officers and professors of each institution conducting the members through the rooms, and explaining the exhibits. Later, the party gathered at Leinster House, where they were received by Dr. Ball, who conducted them round the Science and Art Museum. In the evening the Association dinner was held at Jury's Hotel.

JUNE 28th.—This day was devoted to an excursion into County Wicklow. The party took train to Bray, and drove to the Dargle, through which they walked. Mounting the cars again, they were driven to Powerscourt, where, by kind permission of the Viscount, the house and grounds were viewed and much admired. Lunch was then provided at Enniskerry, after which the party drove to the Waterfall, returning in the evening by the Rocky Valley to Bray. Most of the members then returned to town, but several remained for tea, and a walk round the Head, where the Cambrian and Drift beds were examined and some specimens of *Oldhamia* obtained.

JUNE 29th.—The reading and discussion of papers were resumed. Mr. W. E. HOYLE, M.A., of the Manchester Museum, read a paper "On Desk-cases illustrating the Foraminifera, and the classification of Bivalve Mollusca," in that institution, showing by means of lantern slides the arrangement of the cases and their contents. The case of Foraminifera contains specimens and magnified models and drawings of those minute and interesting creatures. Descriptive labels are largely used, and explain the general structure of the animals and their classification. At the end of the series, a selection of specimens and maps shows the importance of the shells of these animals in forming submarine deposits.

The case of Bivalve Mollusca described is arranged so as to contrast the classification of Pelsener (founded on the gills), with that of Grobben (founded on the hinge-teeth). Shells are arranged in series so as to show the supposed genetic relationships, and the difference between the two systems of classification is shown by different dividing lines.

A paper by Mr. B. H. MULLEN, M.A., of Peel Park Museum, Salford, on Museums and Ratepayers, was read by Mr. Platnauer. This contribution advocated the liberal support of museums by town authorities, specially urging that curators should be relieved, as far as possible, of merely routine and mechanical work.

Mr. HOYLE, and his assistant at Manchester, Mr. T. H. BOLTON, gave a paper entitled "Classified Cataloguing as applied to Palæozoic Fossils." The system, applicable to all natural history specimens, indicates each species by a symbol made up of a combination of letters from four alphabets (aaaa to zzzz). By this means a far larger number of species can be registered than by the means of numerals, unless an inconveniently long series of digits be used. The system will be recognized as a modification of the well known decimal system of numerals now used in many library catalogues.

Mr. T. H. BOLTON contributed a "Supplementary List of Type Fossils in the Manchester Museum."

Mr. H. O. FORBES, of Liverpool, read a paper on "The Centralisation of Types." Commenting on the inconvenience of naturalists having to travel about the country to see the various type specimens of any group at which they might be working, he urged that all type specimens in the British Isles should be collected at London, Edinburgh, and Dublin, and expressed his opinion that specimens of general interest might readily be got in exchange from the National Museums in those cities, which would compensate the local museums for parting with their types. This paper led to a very interesting discussion. Professor

J. W. Carr, of Nottingham, expressed his entire agreement with Mr. Forbes' views, and his own willingness to resign the types under his care to the British Museum. But as curators were not the owners of the specimens, he feared the realisation of the plan to be impossible, as the local authorities would not consent to give up their most cherished specimens. Mr. Platnauer, of York, hoped that in time, authorities might be educated up to such self-sacrifice, but contended that many advantages accrued from the present system. The specialist, in a visit to a local museum, sees many interesting specimens which he might otherwise miss, while his experience is of great value to the local curator. Mr. F. A. Bather, of the British Museum, thought that type specimens should be preserved in the localities where found; he objected to have to go to America to see types from Germany, or to St. Petersburg to inspect types from the British Isles.

Mr. F. A. Bather, M.A., read some "Notes on Travel," describing museums he had seen in South Africa, Australia, and New Zealand, and pointing out features in their arrangement worth imitating or avoiding.

Professor T. Johnson, D.Sc., gave a paper on "The Functions of a Botanical Museum," advocating that collections should be formed to assist students in the study of various groups of plants, and that special attention, particularly in Ireland, required to be paid to agriculture, horticulture, and other practical applications of botany.

A short business meeting followed, at which Edinburgh was fixed as the place of meeting for 1895, and the Lord Provost of that city was elected President.

In the afternoon Trinity College was visited. The members were met by the Librarian and Professors, and conducted over the Library, and the geological, zoological, and anatomical museums. The ancient illuminated books and other treasures of the Library much interested the visitors, who also paid special attention to the anthropometric laboratory. At the close of so well-occupied a meeting, however, it was no wonder that some were observed to turn aside to watch the cricket match in the College Park!

Royal Zoological Society.

Recent donations comprise a Long-eared Owl from A. R. C. Newburgh, Esq.; a St. Kilda Sheep from Dr. A. Finegan; and a Wood-Pigeon from W. W. Despard, Esq.

10,580 persons visited the gardens in June.

Belfast Naturalists' Field Club.

June 30th.—Half-day excursion to Scrabo Hill. A party numbering over eighty assembled at Linen Hall at 2.30, and drove via Dundonald to Scrabo Hill, where the quarries of Triassic sandstone intersected with dykes and the overlying deposit of boulder clay were studied. Tea was subsequently provided at the Ulster Hotel, and the party reached Belfast at a late hour.

Belfast and Dublin Naturalists' Field Clubs.

June 16th.—An interesting joint excursion was held on this date, when a party of forty-five Dublin members proceeded northward by the 9.0 train from Amiens Street, which was stopped at Laytown, to allow the members to alight, by the courtesy of the superintendent of the line. A party of some fifty members of the Belfast Naturalists' Field Club and

thirty-five members of the North Staffordshire Field Club came from Belfast by the 7.0 a.m. train, and while the majority of the party elected to alight at Drogheda and spend the day in studying the interesting pagan cemetery of New Grange, others proceeded by rail to Laytown and joined the Dublin Naturalists. No time was lost in proceeding to the shore, where a cool breeze was coming in off the sea. The route lay northward to the mouth of the Boyne, along a glorious sandy beach backed by low dunes, and the members found ample scope for their various tastes. The botanists of the party were pleased to find, among other plants, the One-glumed Fescue Grass (*Festuca uniglumis*), Green-winged Orchis (*Orchis Morio*), Portland Spurge (*Euphorbia portlandica*), Sea Spurge (*E. Paralias*), Houndstongue *Cynoglossum officinale*), Sea-holly (*Eryngium maritimum*), Viper's Bugloss (*Echium vulgare*), and Common Bugloss (*Lycopsis arvensis*). Others collected fungi. Mr. J. E. Duerden made good finds among the hydroids and polyzoa thrown upon the beach by the tide; a separate note on these groups will be found on p. 169. At the mouth of the Boyne, the three light-houses and the picturesque form of Maiden Tower engaged attention, and the walk was resumed to the village of Mornington; on this part of their journey the botanists found the Hen-bane (*Hyoscyamus niger*), Lesser Broom-rape (*Orobanche minor*), the Sea Wormwood (*Artemisia maritima*), Sea Purslane (*Obione portulacoides*), and other commoner species.

The entomologists found much to interest them. As will be seen from the following list very good work was done amongst the Coleoptera; the more important species taken are as follows—*Broscus cephalotes; Badister bipustulatus; Harpalus tardus*, taken by Mr. Carpenter, is a local insect, having been recorded from only two or three localities in Ireland; *H. anxius*, Mr. Standen took an example on the sand-hills, we are not aware of its having been previously recorded for Ireland; *Dichirotrichus pubescens* and *Pogonus chalceus* on the shore near Mornington; *Bembidium decorum* and *B. atrocæruleum; Amara trivialis; Calathus flavipes; Demetrias atricapillus; Cercyon littoralis, C. flavipes; Philonthus longicornis*, one specimen taken by Mr. Halbert on the sandhills; *Stenus tarsalis; Micralymma brevipenne*, several under stones on the shore near Mornington; *Saprinus maritimus*, taken by Mr. Cuthbert; *Coccinella xi-punctata*, the larvæ swarmed on the sand-hills; *Halyzia xxii-punctata; Rhizobius litura; Byrrhus dorsalis; Cytilus varius; Simplocaria semistriata; Pityophagus ferrugineus; Dascillus cervinus; Helodes minuta; Telephorus nigricans*, var. *discoideus; Ochina hederæ, Lacon murinus; Rhagium indagator*, Mr. Standen was very fortunate in taking a specimen of this rarity off the Jessamine growing near the farmhouse at the beginning of the Boyne sandhills, it had probably emerged from some split logs which he saw lying on the shore embankment, evidently intended for fencing purposes, this handsome Longicorn appears not to have been previously taken in Ireland, but it is to be feared the logs may have been imported. *Phædon tumidulus*; *Heliopathes gibbus* occurred under stones in the sand-hills near Boyne mouth; *Apion hydrolapathi, Gyllenhali, radiolus*, etc. *Otiorrhynchus maurus; Hypera punctata; Anthonomus rubi; Grypidius equiseti; Cassida viridis.* Mr. H. K. G. Cuthbert obtained several fine species of hymenoptera on the sand-hills, including *Crabro peltarius.* Dr. Scharff found several specimens of *Metoponorthus pruinosus*, Br., under a stone near the mouth of the Boyne. This rare woodlouse has not been found in Ireland for many years; its only known locality here is near Dublin, where the late Dr. Kinahan took it. The characteristic snail of the district, *Helix pisana*, was observed in abundance.

At Mornington cars were in waiting to convey the party to the Whitworth Hall, Drogheda, which was kindly placed at their disposal by Mr. James H. Cooke, J.P. Here they were joined by a large party of the Belfast and North Staffordshire members, who under the able guidance of Mr. George Coffey, M.R.I.A., had spent a profitable day at New Grange.

The combined party, in number over 130, were served with tea by the Misses Gardiner, after which Mr. F. W. Lockwood, President of the Belfast Club, expressed the pleasure of the members of his Society in meeting their Dublin fellow-workers, and in having with them a large party of friends from Staffordshire. Mr. G. H. Carpenter, B.Sc., President of the Dublin Club, acknowledged the compliment on behalf of his Society, and joined with his brother President in welcoming the English Field Club members. Dr. Hinde, President of the North Staffordshire Field Club, gracefully returned thanks, and spoke in terms of approval of the organization and scientific work of the Irish Clubs. After a number of new members had been elected into the various Societies, the Belfast and Staffordshire parties drove off to catch the train for the North. The Dublin members spent a highly interesting and instructive hour in examining the antiquities of Drogheda, and returned to town by the eight o'clock train.

Dublin, Cork, and Limerick Naturalists' Field Clubs.

A very successful meeting, and one which it is hoped marks an epoch in the history of Field Club work in Ireland, was held on July 5, 6, and 7, when the Clubs of Dublin, Cork, and Limerick met to spend three days in examining the district lying around Fermoy, and to confer on the extension of Field Club work in Ireland. Dublin was represented by a party of 19, Cork by 9, while it is a matter of regret that the able Secretary alone represented the Limerick Society. An English contingent who joined the party included Professor Carr, President Nottinghamshire Naturalists' Society. Assembling from different directions at Mallow shortly after mid-day on July 5, the joint party proceeded to Fermoy, where no time was lost in starting along the river banks for the woods of Castle Hyde. In the Blackwater *Ranunculus penicillatus* was observed in quantity, and *Anacharis Alsinastrum* with remarkably abundant blossom. The Castle Hyde woods yielded *Euonymus europæus*, *Epipactis latifolia*, *Lychnis diurna*, great profusion of *Veronica montana*, *Carex sylvatica*, and *C. remota*. The Hop (*Humulus lupulus*) was observed naturalised in hedges. By the old castle at Craig fine specimens of *Orobanche Hederæ* were gathered. Among the beetles collected were *Orectochilus villosus*, *Hydrothassa marginella*, *Lema lichenis*, *Galerucella nymphææ*, *Rhinoncus pericarpius*, and *R. perpendicularis*. Of the hemiptera *Pithanus Maerkeli*, *Calocoris sex-guttatus*, and the local and handsome *Palomena prasina*. The dragon-fly *Calopteryx splendens* and other neuroptera were abundant along the river. The long-horned grasshopper *Leptophyes punctatissima* was found in the meadows. The party returned part by water and part by road.

On the following morning at 9 o'clock, all took their seats in wagonettes, and drove to the fine kistvaen known as the Hag's Bed, which was examined with interest, and photographed. The fine spider *Agetena labyrinthica* was observed in its snare in the stone wall. A little farther on, *Arabis hirsuta* and *Kœhleria cristata* were gathered on walls, along with quantities of *Ceterach officinarum*, *Saxifraga tridactylites*, *Arenaria serpyllifolia*, and *Geranium lucidum*, which are very abundant in this district. *Orchis pyramidalis* was seen in the adjacent meadows. Passing through the village of Glanworth, time did not allow of inspection of the old bridge and fine ruined castle. *Hypericum dubium*, *Sambucus Ebulus*, and *Pastinaca sativa* were seen about the ruins. The next stop made was at Mitchelstown Castle, where a short time was spent, after which the party drove to Galtymore Castle, magnificently situated on the edge of a deep and richly wooded glen at the foot of the Galtee mountains. Here *Lastrea æmula* grew in profusion. There was much tempting collecting ground in this vicinity, but time necessitated pushing on to Mitchelstown caves, where lunch engaged attention for a short while, after which candles

and matches were served round, and the inspection of the celebrated caverns was commenced. The passage which serves as an entrance appears to have been accidentally discovered during quarrying operations. It descends for a considerable distance at a sharp angle, afterwards opening out into a more or less horizontal series of passages with occasional expansions into caverns of considerable size, richly draped with stalactite and stalagmite. With the assistance of magnesium wire, a member took several views of these caverns. Entomologists searched eagerly for the characteristic cave spring-tail, *Lipura Stilicidii*, Schiodt., discovered here forty years ago by Dr. E. P. Wright, and the late A. H. Haliday, and their efforts were rewarded by a fair number of specimens beneath the wet rocks. A few examples of another insect of the same group, *Templetonia crystallina*, Müll., were also obtained. Male and female examples of the small spider *Porrhomma myops*, described by Simon from caves in France, were also found, as well as a gamasid mite. A few earthworms and a common Frog completed the observed fauna.

By the time the exploration of the caves was completed, the afternoon was far advanced, and the return journey was commenced; proceeding *via* Mitchelstown, Fermoy was again reached shortly after 8.0. After dinner a meeting of the combined Clubs was held. The chair was taken by Mr. G. H. CARPENTER, B.Sc., President of the senior (Dublin) Club. In opening the meeting, the Chairman expressed the pleasure of the Dublin Club at meeting so auspiciously, representatives of the Field Clubs of Cork and Limerick, and of one of the English scientific societies. Such meetings were calculated to encourage the members, and to bring about a fellow-feeling between the different Clubs. He hoped they would now hear something of the fortunes of the different Societies represented, and hints for the extension of Field Club work in Ireland; also opinions respecting the proposed conference next year of all the Irish Clubs. On behalf of the meeting, he begged to acknowledge the obligation they were under to the various Secretaries, and to Mr. Copeman, Secretary of the Cork Club in particular, for making the arrangements for the present trip.

Mr. T. FARRINGTON, F.C.S., Vice-President Cork Naturalists' Field Club, endorsed the Chairman's remarks as to their obligation to Mr. Copeman for arranging the excursion; he hoped many more such combined excursions would be held.

Mr. W. H. SHAW, Vice-President Cork Naturalists' Field Club, spoke of the excursions of his Society, and of the advantage to be gained by Field Club trips properly arranged.

Professor J. W. CARR, President Notts Naturalists' Society, thanked the meeting on behalf of his party, for the kindly welcome that had been extended to them on the present excursion, and for the friendliness with which they had been treated. In reply to the Chairman's request for information respecting the work of his Society, he thought that possibly his Society had much more to learn from these young Clubs than they could learn from the doings of his Society. He then proceeded to describe the work of the Notts Society, and concluded by saying that if an invitation were sent them to join the proposed Field Club excursion and conference next year, some of his members might be glad to accept it.

Mr. F. NEALE, Secretary Limerick Naturalists' Field Club, regretted that his club was not better represented on this important occasion. As regarded the Limerick Club, he believed that good would come of the present meeting, and he thoroughly approved of the suggestion for a meeting of all the Clubs next year. His members sometimes felt the want of a central authority to whom they might send records of interest, or submit specimens for identification.

The Chairman pointed out that it was for these very purposes that the *Irish Naturalist* had been established, and that the editors of that magazine were only too anxious to help workers in Ireland in these or any other ways.

Professor GRENVILLE COLE, F.G.S., Vice-President Dublin Naturalists' Field Club, in response to a request from the Chair, gave a short account illustrated by diagrams and maps, of the geology of the district. Subse quently he spoke of the success of the present excursion, and of the advisability of holding more of such meetings. He spoke in complimentary terms of the *Irish Naturalist*, which he considered fulfilled the very want Mr. Neale spoke of, and to which every member of the several Clubs should subscribe.

Mr. JOHN L. COPEMAN, Secretary Cork Naturalists' Field Club, thanked the members for their kind appreciation of his efforts to render the excursion a success. The Cork Club were quite in favour of the proposed excursion next year, for which Athlone and Galway had been suggested as suitable rendezvous.

Mr. R. LLOYD PRAEGER, Secretary Dublin Naturalists' Field Club, on behalf of the editors of the *I. N.*, assured the meeting of their anxiety to give information and to publish records, and to act as a means of communication between the Irish Field Clubs. As to the proposed Field Club conference, he read a letter from Mr. Bigger, Secretary of the Belfast Club, advocating such a meeting, and the meeting having now definitely approved of the scheme, he thought the matter might be safely left in the hands of his fellow-secretaries to carry out; he felt no doubt that it would have a stimulating and beneficial effect on Irish Science.

The meeting then broke up.

Early on the third morning a start was made in wagonettes down the beautiful Blackwater Valley for Lismore. On the way a few plants were noted—*Verbascum Thapsus*, *Arenaria trinervis*, and *Euphorbia hiberna* (one plant by road-side—planted ?). Arrived at Lismore Castle, the "hanging gardens" were appointed a rendezvous, and members were allowed two hours to engage in their favourite pursuits. The botanists found good ground in the woods and neighbouring magnificent glen, and returned with *Milium effusum*, *Festuca sylvatica* (second record for Co. Cork), *Lastrea æmula*, and *Orobanche Hederæ*.

The entomologists found Lismore an admirable collecting ground. The very rare moth *Grophria quadra* was taken by Mr. F. Neale on the bark of an oak tree, while the wings of *Dasychira pudibunda* were found in a spider's web. Beetles included *Bembidium punctulatum*, *Deronectes depressus*, *Elmis Volkmari*, *Crepidodera helixines*, *Leiopus nebulosa*, *Athous niger*, *Galerucella lineola*, *Lagria hirta*, *Ceuthrorhynchus litura*, *Cassida equestris*, *C. viridis*, and *C. flaveola*. Among the Hemiptera were *Palomena prasina*, *Salda saltatoria*, *Calocoris striatulus*, and *Sigara minutissima*. The dragon-fly *Calopteryx virgo* and the stone-fly *Perla maxima* were taken near the river. A complete list of the insects taken will be published in due course. Among spiders *Prosthesima Latreillei* and *Linyphia montana* were noteworthy; also *Oligolophus ephippiatus* among the Harvestmen.

At lunch, which was ready in the gardens, specimens of *Orobanche rapum*, found in the neighbourhood by the forester of the estate, were shown, and a house-spider, *Pholcus phalangioides*, new to Ireland, was discovered by Mr. D. W. Freeman in a room. The return drive to Fermoy was made along the southern bank of the Blackwater, where *Hypericum dubium* grew in great abundance on banks by the roadside. Fermoy was reached punctually at 5.0, when dinner was ready, after which the party proceeded to the railway station and departed to their several homes, amid mutual expressions of satisfaction and pleasure at the success of the excursion, and the enjoyment derived from it, and at the beautifully fine weather with which they were favoured.

The Irish Naturalist.

Vol. III. SEPTEMBER, 1894. No. 9.

NOTES ON THE BREEDING BIRDS OF INCH, LOUGH SWILLY.

BY D. C. CAMPBELL.

THE district of Inch, Lough Swilly, with its heather-clad hill, its extensive sloblands, and stretches of weed-grown fresh water, is a most interesting one to the ornithologist. Indeed nowhere have I found a locality frequented by so many species of birds. Professor Leebody has given much interesting information regarding the winter visitants to Inch (*Irish Nat.*, Dec., 1892). In the following paper I give a few notes upon some of the breeding birds and their nests, selecting only the more interesting species.

The first I mention is the WHINCHAT (*Pratincola rubetra*, L.). In May, 1891, Mr. Gibson and Mr. Samuel Bryson found a nest in a Whin-bush on the border of the slobland. They saw and identified the birds. This is the only instance I know of this species breeding near Derry.

The SAND-MARTINS (*Cotile riparia*, L.) used to breed in considerable numbers in the sand-bank beside Inch Road station, but of late years have almost abandoned the spot. The last time I visited the bank only one pair had nested. Close to this bank I had the pleasure of seeing together in the air at the same time the Sand-Martin, SWALLOW (*Hirundo rustica*, L.), MARTIN (*Chelidon urbica*, L.), and SWIFT (*Cypselus apus*, L.). When the Swift arrives, the winter visitants are wending their way northwards. A few, however, remain a week or two later. The Scaup (*Fuligula marila*, L.), Wigeon (*Mareca penelope*, L.), and White-fronted Goose (*Anser albifrons*, Scop.) are to be seen until the second or sometimes even until the third week of May.

The breeding ducks are the MALLARD (*Anas boscas*, L.), TEAL *Querquedula crecca*, L.), COMMON SHELDRAKE (*Tadorna cornuta*, G. S. Gmel.), and SHOVELLER (*Spatula clypeata*, L.) The Shoveller is called here the "Spoonbill Wigeon" or "Whiteside." It is a constant breeder on the sloblands although, I believe, in decreasing numbers. The herd boys are, no doubt, responsible for the destruction of many eggs. The nest is made on the bare slobland, and is placed in the centre of a slight tuft of grass, or rather on a spot where the grass has grown a little more thickly than usual. There is little or no cover in the ordinary sense of the word to be seen on the ground, and I have known a nest to be made on such a bare ridge that one could not see what there was to cover the back of the brooding duck. The bird scrapes out the ground sufficiently to make a shallow saucer-like hollow. This is lined with dry grass and old grass-stems and a plentiful supply of down. In the spring of 1889 and 1890 I saw a few nests from which the old bird had evidently been driven away before laying. The usual number of eggs is nine to twelve, and there is sometimes a slight variation in size and shape. It is astonishing how the Shoveller's nests escape being trampled upon by the grazing cattle as they walk up and down the ridges.

Close by the slobland the WATERHEN (*Gallinula chloropus*, L.) and COOT (*Fulica atra*, L.) breed in great numbers in the rushes and sedges which cover the water here and there. Many years ago the WATER RAIL (*Rallus aquaticus*, L.) bred, but I have not heard of a nest having been found recently.

Some little distance from the marsh lands the shores are barer and more sandy, and here we find the RINGED PLOVER (*Ægialites hiaticula*, L.) during the spring. I have often heard the little Plovers calling around, and yet the grey plumage of their backs blended so perfectly with the wet sand and shore that it was almost impossible to spot the birds at any distance. There is much suitable ground for their breeding, but they seem to confine their nesting to a low flat sand-bank called the Farland bed. This bank is some 200 yards long by about 100 broad, and is covered in the centre with coarse grass and a few scrubby brambles. It is surrounded on all sides by fresh water. The Ringed Plover do not nest on the sand and shingle alone. A number lay

their eggs upon the grass, and my brother once found a nest in the centre of a low patch of brambles which formed a canopy over the eggs. Along with the Ringed Plovers a colony of the COMMON TERN (*Sterna fluviatilis*, Naum.) frequent the bank. The Terns arrive about the third week in May, and the eggs are usually laid by the 20th June. The nests are mostly to be found upon the grass, but in a few cases I have seen them upon the sand or gravel. So far as I can find no Arctic Terns breed in this colony. My observations confirm Thompson's statement that the Arctic Tern breeds on the coast and the Common Tern on more inland waters.

In the first week of June last Mr. John M'Connell, of Burt Slob House, Inch, who takes a great interest in the birds of the district, found the GREAT BLACK-BACKED GULL (*Larus marinus*, L.) breeding upon the Farland sand-bank. He examined the nest, which contained three eggs. The Great Gulls frequent Inch during the shooting season to prey upon the wounded birds, but never before have I heard of their remaining during the breeding season. The fact of Mr. M'Connell's finding it nesting on a sand bank surrounded by fresh water, and some seventeen miles from the open sea, is most interesting.

Passing once more to the slobland we find the LAPWING (*Vanellus vulgaris*, Bechst.) in great numbers. Its plaintive breeding cry may always be heard as one traverses the ridges on a nest-hunt. On the 4th April, 1893, while watching the Peewits from the embankment with Mr. Gibson, we noticed a male Merlin flying overhead. He had seen three Lapwing below, and like lightning he fell upon one. He missed his mark, but with a sudden and beautiful upward sweep and turn he struck the bird dead to the ground. We lay close, being only some thirty yards distant, and saw the Merlin trying to fly off with his victim. It was evidently too heavy for him, for he dropped it after flying a few yards. We then showed ourselves, and off the Merlin flew to some distance, where he kept beating about for some time, evidently loth to lose his prey. When we lifted the Lapwing it was quite dead.

Along with the Lapwing many REDSHANK (*Totanus calidris* L.) nest. The Redshanks leave their winter haunts along the shores during the first and second weeks of April, and about a fortnight later the nests are to be found. These are a little

more artistic than those of the Peewits, but still can hardly be called "things of beauty." They are slightly built of dry grass, and are placed in the centre or by the side of a fairly large tuft of grass. The nest is very hard to find, although the old birds always betray its presence by dashing overhead and uttering their loud alarm notes "tu hu—tu hu." From this cry the bird receives here the name of "Tu-hu" or rather "Big Tu-hu," the Dunlin and Ring Plover being called the "Wee Tu-hu."

I have a most interesting note which shows the care the Redshank takes of its young. On 21st May, 1891, I was working the slobland with Mr. Gibson and Mr. Bryson. We were most anxious to find a Redshank's nest, but feared we were too late for eggs. A pair of birds were however dashing about overhead, and every now and then one of them dropped to the ground some way off. We felt sure that the young birds were near, and for some time we marched up and down the ridges, not missing a single yard of ground. Still no nest or nestlings were to be seen. At last, while we were talking the matter over we suddenly caught sight of one of the Redshanks away at the other end of the slob-ridge, running across the very line of march we had taken. With the bird was a little nestling, and bringing our glasses to bear we saw that the old bird was leading the little one back to the ground which we had just so carefully searched, so that it would be quite clear of the unsearched ground when we arrived at the spot.

Among the breeding birds at Inch, the DUNLIN (*Tringa alpina* L.), is to me about the most interesting. In summer dress with richly marked back, and black-banded breast, it is very beautiful, and looks so different from the plain little grey bird that frequents the shores in winter. On reaching the slobland, before we see the birds we hear their *purring whistle.* It is very hard to locate the exact spot from which the sound comes. Now it seems to sound from the water's edge, now from the distant fields. Thompson refers to the Dunlin's song heard in spring and summer, but I cannot say that we ever heard any notes which could be called a song. We met the birds singly and in pairs, and now and then in small flocks. When met with singly or in pairs they were comparatively tame. The nest is very difficult to find, and it requires con-

siderable time to hunt up five or six. The site chosen is always one of those small tufts of rough grass that are scattered over the slob. The nest is nearly always placed in the centre of the grass, but occasionally I have seen it at the side. It is deeper and more cup-shaped than the Redshank's. The neat little nest, with its four richly marked eggs, is a beautiful sight. In one nest the eggs will all have a warm brown colour with very dark markings; in another the quartet will be pale olive with deep gray spots. Morris says that the Dunlin will fly towards an intruder and endeavour to draw him away from its nest. The very opposite of this was our experience. In no case did we find the birds near their nests, nor did they show themselves, like the Lapwing and Redshank. Thompson mentions the eggs being found upon the gravel like those of the Ringed Plover. At Inch we never found them so. In every case the nests were upon the slobland.

A VISIT TO CASTLETOWN-BEREHAVEN.

BY DAVID M'ARDLE.

It was my good fortune during the May of last year to accompany the first excursion to the extreme South-west, which was organised by the Royal Irish Academy Flora and Fauna Committee, my object being the working-up of the Cryptogamic flora of these parts, and the obtaining of specimens for the Herbarium. Dr. Scharff and Mr. Carpenter of the Natural History Museum, collected and investigated the land-fauna. Professor Johnson, with Mr. Duerden, investigated and collected marine plants and animals, and to Dr. M'Weeney fell the difficult task of investigating the Fungi; he also conjointly with myself noted and gathered the flowering plants and ferns. The principal object of my visit was to examine the moss and liverwort flora, which proved to be very interesting, as will be obvious from the appended lists.

The following is a brief outline of our proceedings. We left Dublin by the mail at 6.10 p.m., on the 26th May, and arrived in Cork at 11.30. Next morning we started at 9 o'clock for Bantry. The scenery on the route was beautiful. On the banks of the Bandon River the Royal Fern (*Osmunda regalis*)

grows abundantly ; the water was dotted with pale sheets of a *Ranunculus*, which floated many yards in extent, covered with flowers. In the small lakes in the adjacent bogs the White Water-lily (*Nymphæa alba*) was in full bloom, and ferns of the *Lastrea* type clothed the ditch banks, mixed with large specimens of the Irish Spurge (*Euphorbia hiberna*). A shallow peat-bog was most interesting; the turf was being removed for fuel, and exposed the remains of an ancient forest. Many of the trunks were prostrate as they fell, others, much shorter, were standing in their natural position. From Bantry there are two routes to Castletown-berehaven, where we were to stay, one by water, and the other by land. One of the party went in a small steam-boat, taking luggage, &c., while the remainder continued the journey by car, not a "Bianconi," on which most of us at some period or other have made long journeys, but a comfortable omnibus, from the outside of which one can enjoy the scenery, and we soon made considerable progress through a most interesting country, the road being flanked on either side by wild rocky glens clothed with verdure. The harbour of Glengariff soon appeared in view, then the village, where we remained for a short time to change horses, and on again for Castletown-berehaven. We got an excellent view of the Sugar-loaf and Caha Mountains. The "Deadhe," or Hungry-hill is conspicuous above all the others from its towering height; on its summit is a small lake that bears the reputation of harbouring something "uncanny" beneath its dark waves, and two of our party, when collecting there, were warned in a solemn strain by a kindly native not to go near it. We passed the famous waterfall at Adrigole, and although only a slight stream was then falling we could form an idea of its grandeur after a heavy rainfall. We soon arrived at our destination, and were comfortably settled in Mrs. Murphy's Hotel.

The following day (Sunday) was quiet, and with the exception of an afternoon stroll about Dunboy, we did no actual work. On the 29th we carefully examined the bogs and lakes about Castletown-bere, and on to Pulleen. On the river bank *Rosa mollissima* was in bloom, and partly submerged *Littorella lacustris* was in fine form. On the rocks at the mouth of the river at Pulleen Cove we gathered Templeton's pretty *Enthostodon*, and a rare liverwort, *Fossombronia angulosa*,

Dicks., which was growing abundantly in the crevices of the rocks forming the bed of the stream. On the 30th, Dr. M'Weeney and I crossed to Bere Island, noted the more common plants, and took specimens of any rare or interesting ones, amongst which was *Cicendia filiformis*, of which Dr. M'Weeney detected a few plants near the end of the island, not far from Piper's Point. This was the most interesting find amongst the flowering plants. We also gathered *Nasturtium amphibium*, Br., *Rosa pimpinellifolia*, L., *Myosotis collina*, Hoffm., and a few plants of *Pinguicula lusitanica*, L. Amongst the mosses I gathered *Campylopus longipilus*, Bridel., and *C. setifolius*, Wils., and the following rare liverworts :— *Frullania germana*, Taylor, *Cephalozia denudata*, Spruce (Lindberg), previously known to grow in only two localities in Ireland ; *C. divaricata* var. *Starkii*, Spruce (= *J. Starkii*, Funck), *Kantia arguta*, Nees., *Nardia hyalina*, Lyell., *Fossombronia pusilla*, L., *F. angulosa*, Dicks. The early part of the day only was favourable for our work, as in the afternoon it rained heavily, which, however, did not prevent us from covering a large portion of the island, and gathering many plants. A week might be spent collecting on the island with good results. On the 31st, Dunboy Wood and adjacent bogs were carefully examined. *Saxifraga umbrosa* and *Euphorbia hiberna* were in fine form ; amongst the liverworts, *Lejeunea flava*, Swartz, the typical plant, not differing in form or luxuriance from specimens gathered by Dr. Spruce in the Amazon Valley in South America, and seven other species of the genus were gathered in more or less abundance in this moist, warm, shaded wood, including *Harpa-Lejeunea ovata*, Taylor (Spruce). I also detected *Kantia arguta*, Nees., *Nardia hyalina*, Lyell., and *Metzgeria conjugata*, Dill., and doubtless other varieties would reward a careful search. On the bogs, *Drosera rotundifolia* and *D. intermedia* were abundant and vigorous in the bright sunshine. A plant of the latter species had enfolded a Dragon-fly with its glandular tentacles.

On June 1st, at 6 a.m., we all boarded the steamship "Tearaght" in Bantry Bay, commanded by Captain M'Combie, who was much interested in our work, and promised to land us on Dursey Island, which he was passing. We had a good view of the rocky coast, Pulleen Harbour, Ballydonegan Bay, &c. ; a sumptuous breakfast with our kind host concluded

this little sea trip, which is not likely to be forgotten by us. The island we found scanty in vegetation on account of its exposed position and the dry season. *Senebiera Coronopus* was plentiful near the sea where we landed. *Anthyllis vulneraria* was abundant in bloom everywhere, and isolated patches of *Rosa spinosissima* were met with in several places. *Asplenium marinum* and *Crithmum maritimum* were plentiful amongst the rocks near the sea. Amongst the mosses *Campylopus longipilus*, Bridel., was plentiful in damp places, and on the rocks *Grimmia trichophylla*, Greville, and *G. leucophœa*, Greville, were gathered. The rarest amongst the liverworts collected were *Frullania germana*, Taylor, *Cephalozia divaricata* var. *Starkii*, Spruce, *Nardia obovata*, Nees (Carrington), very scarce; this is the true plant, with ascending stems and purple rootlets. *N. hyalina*, Lyell, *Fossombronia angulosa*, Dicks., plentiful amongst rocks near the sea. We collected carefully up to the highest point of the island at Ballymacallach (?), from which the view of the Kerry mountains compensated in some degree for the scantiness of the vegetation. We crossed from the island to the mainland at Garnish-point, and collected on the coast and hills for some distance, where we were joined by the rest of the party, and drove into Castletown. On June 2nd, we started early for Adrigole, and struck the river about 3½ miles from the waterfall, following its rather tortuous course, and some good collecting was done. *Cicendia filiformis* we gathered sparingly by the side of a pathway; *Lobelia Dortmanna* in bloom by the river bank; *Pinguicula grandiflora* was in great beauty, and many pretty varieties of *Orchis maculata; O. incarnata Habenaria bifolia*, and *H. chlorantha*, and other plants were gathered in this moist valley. We ascended Caha Mountain, following the margin of a small stream, and some interesting cryptogams and other plants were collected. We found *Hymenophyllum tunbridgense*, Sm., and *H. unilaterale*, Willd., to be very scarce, though both species abound on the other side of the range at Glengariff. Amongst others we collected the following mosses and liverworts:—*Campylopus flexuosus*, Dill., *Distichium capillaceum*, Br. & Sch., *Scapania æquiloba*, Dumort., *S. umbrosa*, Schrad., *Plagiochila punctata*, Tayl., and *Riccardia latifrons*, Lindberg. We arrived at the summit about 6 p.m., and carefully examined the lakes, which

are numerous. *Potamogeton polygonifolius* was plentiful; *Apium inundatum*, Reich., we gathered in the largest lough (Lough Brandy?) We descended the rather steep slopes to the valley of Glengariff, the woods of which afford good collecting, but it was now too late to do much, so we hurried on to the Belle Vue Hotel, tired after a hard day's work. Next morning we started for Bantry, and on to Cork, where we got the mid-day train, and arrived in Dublin about 5.30 p.m., and thus ended one of those enjoyable excursions not to be forgotten, and far from being devoid of interest. The time for collecting over such a wide area was very short, and the pace in consequence was very fast. The total number of Phanerogams and Ferns collected or noted was 165. Of the mosses 38 species and varieties were collected, amongst them the following nine species are not reported from Co. Cork in Dr. D. Moore's work on the mosses of Ireland:—*Campylopus longipilus*, Bridel., *C. setifolius*, Wils., *C. flexuosus*, Dill., *Distichium capillaceum*, Br. & Sch., *Grimmia trichophylla*, Greville, *G. leucophœa*, Greville, *Gymnostomum rupestre*, Schwaegr. (= *Mollia ceruginosa*, Smith), *Bryum pseudotriquetrum*, Schwaegr., *B. erythrocarpum*, Schwaegr. var. *B. murorum*, Schimp. (= *B. muralis*, Wils.). Fifty species and varieties of Hepatics were collected, many of these in Dunboy wood; this place and Glengariff would well repay a visit of longer duration. The following twenty-seven have not been reported from the Co. Cork previously, that I am aware of:—*Frullania germana*, Taylor, *Lejeunea patens*, Lindberg, *L. flava*, Swartz, *L flava*, Spruce (the yellow-green form), *L. Moorei*, Lindberg, *L. ovata*, Taylor, *Cephalozia catenulata*, Huben, *C. bicuspidata* var. *setulosa*, Spruce, *C. Lamersiana*, Huben, *C. curvifolia*, Dicks., *C.* (*Odontochisma*) *denudata*, Lindberg, *C. divaricata* var. *Starkii*, Spruce, *Kantia arguta*, Nees, *Lepidozia setacea*, Web. (Lindberg), *Scapania undulata* var. *purpurascens*, Huben, *S. nemorosa*, Dumort, *S. umbrosa*, Schrad., *Plagiochila punctata*, Tayl., *Nardia crenulata*, Sm. Lindberg, *N. gracillima*, Sm. Lindberg, *N. obovata*, Nees, *N. hyalina*, Lyell, *Fossombronia pusilla*, Linn., *F. angulosa*, Dicks. *Pellia calycina*, Nees, *Metzgeria conjugata*, Dill., *Riccardia latifrons*, Lindberg, *R. pinguis*, Linn. To Mr. A. G. More, F.L.S., and Mr. R. Lloyd Praeger I offer my best thanks for their kindness when consulted on matters of doubtful nomenclature.

NOTES ON GLACIAL DEPOSITS IN IRELAND.

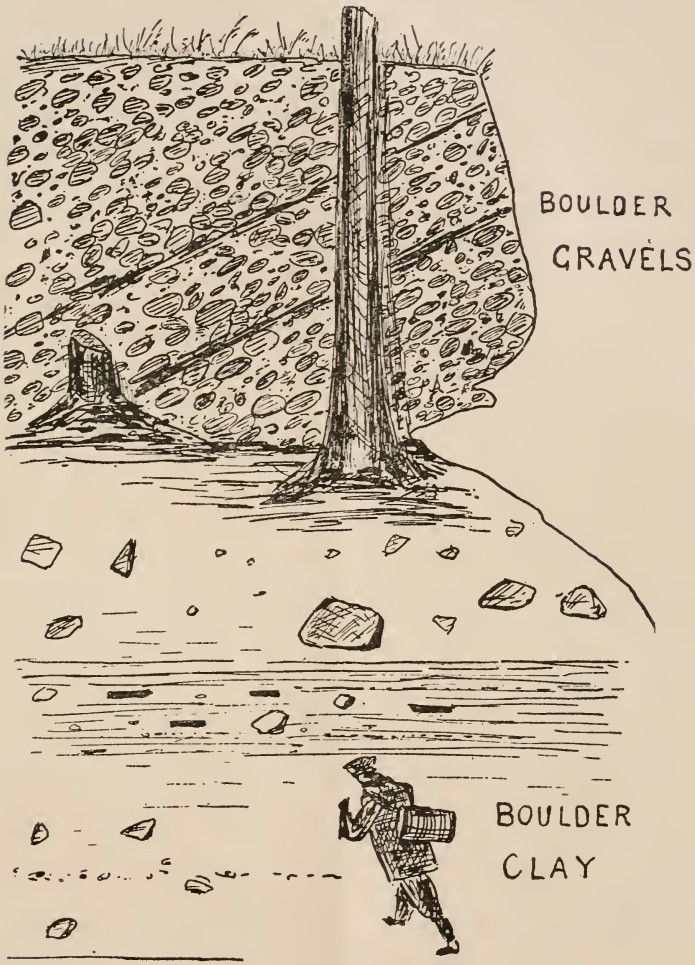
BY PROFESSOR W. J. SOLLAS, F.R.S., AND R. LLOYD PRAEGER, B.E.

I.—The Bray River.

(*Concluded from page* 166.)

Crossing the bridge at Enniskerry, and turning back towards Bray down the northern side of the stream, we find a steep wooded slope rising above the stream-bed to a height of perhaps 100 feet. This is formed of glacial deposits from foot to summit, the lower half, roughly speaking, being boulder clay, the upper half boulder gravels. Sections are few, and the beds where seen are very similar in character to those on the other side of the river, which have just been described; we therefore pass them by, and proceed to the interesting exposures, not yet dealt with, which occur on the southern bank between Bray and Dargle bridge. Leaving Bray, we cross the end of a little valley where a streamlet has cut through the drift to a depth of fifty or sixty feet, and find our first section in a wooded bank which overhangs the stream; the base of the section is but a foot or two above the level of the river, which here flows through a flat alluvium-filled valley to the sea, with steep bluffs of drift rising boldly on either bank. In our first section (fig. 4) we find twelve feet of red boulder clay succeeded by a conglomerate of boulder gravels. In places the boulder clay is clearly laminated; at one spot fourteen alternating horizontal layers were counted in a height of six inches, the different laminæ being distinguished by the predominance of sand or clay; while a band of small pebbles, some three inches in thickness, was traced horizontally along the cliff for a distance of thirty to forty feet. The stones in the boulder clay are for the most part small (one inch in diameter), but a few are one to two feet across; they consist chiefly of Carboniferous limestone. Cambrian quartzite, and granite. The flatter stones lie parallel to the lamination planes; the larger and more irregular fragments lie in no particular direction. A careful examination of this laminated clay revealed no indication of shearing having taken place, and the stratification appeared such as could only be produced by deposition in water. Fragments of marine shells are frequent. The clay becomes a little more stony towards the top, and is

Fig. 4.



succeeded sharply by boulder gravels, in the form of loose coarse angular sand, without clay, and containing pebbles of all sizes. The surface of the boulder clay being cleared of this deposit, it was observed that the stones in the clay projected quite irregularly, without forming a pavement or showing any general striation. The stones in the boulder gravels were as usual—Carboniferous limestone, red Cambrian slate, granite,

riebeckite granophyre, and vein quartz, many thoroughly rounded. One inch above its junction with the boulder clay the deposit is cemented into a hard conglomerate for a thick ness of several feet. This section corresponds to that which lies near the road on the other side of the river. As we pass up the river-bank along this section, the boulder gravels present us with an exceedingly complex succession of deposits. Not far from the section just described, we observe above the boulder clay a bed of fine sand some five feet thick, well laminated, and containing numerous fragments of *Tellina balthica*, *Astarte sulcata*, *A. borealis*, *Leda pernula*, and other species of marine shells. This is succeeded by fourteen feet of boulder gravels, of the usual character in the lower half, but in the upper half formed of an irregular layer composed almost exclusively of fragments of slate. Above this is ten feet of exceedingly fine laminated sand. The boulder gravels contain blocks of granite, some three feet long by one foot six inches thick. One of these is of particular interest since it contains spodumene, and closely resembles the granite which occurs at Ballycorus Hill, two miles to the N.W.; granite containing spodumene was also at one time found in the quarry at Killiney, four miles N. The boulder gravels continue with varying character some distance up the stream. The bed characterised by slate fragments thins out in lenticular fashion within a short distance. Near its termination the slate fragments were observed lying parallel with the oblique lamination which there characterises the deposit. A remarkable feature of this bed here is the presence of numerous included rolled fragments of red boulder clay. The occurrence of great fragments and pebbles of boulder clay is a noticeable feature of the boulder gravels near their junction with the boulder clay. The occurrence near the base of the boulder gravels of a distinct layer of pebbles to which pebbles of boulder clay contribute is also to be observed. We need not refer again to the varying character of the boulder gravels at this place except to observe that the fine sand replaces the gravels and pebbly beds until thirty feet of finest sand appears, extending down to within twelve feet of the river. A little further up the valley pebbly boulder gravels again come in, and eventually entirely replace the sand.

As regards the boulder clay, its lamination may be frequently

observed, particularly in its upper portion; it is well seen in the cliff at the sluice where a mill-race leaves the river two-thirds of a mile above Bray Bridge. Here the lower part is horizontally banded somewhat coarsely, and contains large boulders; in the upper portion it becomes much more finely, but still horizontally laminated, and the included stones are smaller; in this portion blackish layers are separated by white ones of granite sand, two inches in thickness. Shell fragments are abundant here; the species identified were *Cardium edule*, *Cyprina Islandica*, *Astarte sulcata*, *A. borealis*, *Tellina balthica*, *Mya truncata*. The boulder clay is here overlaid by a bed of boulders, remarkable for their size, being frequently three feet long by two feet high. One of them was of Lambay porphyry, rounded, polished, and grooved. If we ascend the cliff and the succeeding slope to the S.E., we reach a road leading to Bray, which runs above the valley parallel to the stream, and in a cutting here is seen a blue sandy clay, containing striated boulders chiefly of Carboniferous limestone, together with granite, and also fragments of marine shells. This is evidently a boulder clay overlying the boulder gravels, and separated by them from the thick deposit of boulder clay which we have described; numerous other sections terminate upward in a somewhat similar manner.

It is an admitted generalisation, to which we have found no exception, that the surface of the rocks underlying the boulder clay have been denuded by glaciation; and the district which we have described, like other districts in Ireland, has evidently been overridden by ice. This denuded surface is overlaid by a thick deposit of boulder clay, which points clearly to a period of deposition. The conditions under which the boulder clay was deposited cannot have been, as appears so generally assumed, the same as those under which the district was denuded. Fine clay is generally deposited in quiet waters some distance from its source, and our boulder clay has much the aspect of a tranquil marine deposit. On the other hand, the boulder clay contains large stones, but these are of an exceptional character, they show signs of glaciation, and are suggestive of a different mode of transport. Judging from the thickness of the boulder clay, the conditions under which it was deposited must have persisted for a considerable period. The intercalation of occasional beds of

gravel and sand marks episodes in this period prophetic of the great change of conditions which brought in the boulder gravels. These, by their coarseness, and by their sudden and frequent changes of character, can only have been deposited by swiftly moving water, which was even capable of denuding the boulder clay in one place before depositing it as rounded pebbles in another.

INSECTS COLLECTED BY THE ROYAL IRISH ACADEMY FLORA AND FAUNA COMMITTEE, 1893.

BY REV. W. F. JOHNSON, M.A., F.E.S., J. N. HALBERT, and GEORGE H. CARPENTER, B.SC.

LEPIDOPTERA.

No very striking results rewarded our work among the butterflies and moths, the majority of the species obtained being common and widely distributed. Under these circumstances we content ourselves with a simple enumeration of the insects from each locality, commenting only on the scarcer and more interesting specimens at the end.

At COOLMORE the following species were taken:—*Pararge egeria, P. megæra, Satyrus semele, Epinephele ianira, E. hyperanthes, Argynnis paphia, Vanessa urticæ, V. atalanta, Polyommatus phlæas, Lycæna icarus, Pieris rapæ, P. napi, Zygæna filipendulæ, Nudaria mundana, Arctia caia, Notodonta ziczac, Leucania conigera, L. comma, Xylophasia lithoxylea, X. monoglypha, Charæas graminis, Luperina testacea, Mamestra furva, Apamea leucostigma, A. didyma, Miana fasciuncula, M. literosa, M. bicoloria, Caradrina taraxaci, C. quadripunctata, Agrotis vestigialis, A. tritici, Noctua augur, N. baia, N. xanthographa, Triphæna ianthina, T. comes, T. pronuba, Amphipyra tragopogonis, Polia chi, Phlogophora meticulosa, Hadena oleracea, Gonoptera libatrix, Plusia gamma, Habrostola tripartita, H. triplasia, Hypena proboscidialis, Selenia bilunaria, Acidalia bisetata, Abraxas grossulariata, Larentia didymata, Hypsipetes sordidata, Melanippe sociata, M. fluctuata, Camptogramma bilineata, Cidaria testata, Pelurga comitata, Eubolia limitata, Anaitis plagiata, Scopula lutealis, Hydrocampa stagnata, Platyptilia ochrodactyla, Crambus tristellus, C. perlellus, C. culmellus, Tortrix ribeana, Argyrotoza conwayana, Catoptria cana, Simœthis fabriciana, Eupœcilia atricapetana, Plutella annulatella, Lita marmorea.*

At CAVAN the only moths taken were *Hydrœcia micacea, Tœniocampa munda* (pupæ) *Scopelosoma satellitia, Xanthia circellaris, Xylina ornithopus,* and *Oporabia dilutata.*

Around BEREHAVEN, the species captured or noted were:—*Pararge egeria, P. megæra, Cœnonympha typhon, C. pamphilus, Melitæa aurinia, Vanessa atalanta, Polyommatus phlæas, Lycæna icarus* (these two lycænids were the only butterflies observed on Dursey), *Thecla rubi, Pieris brassicæ, P. napi, Euchloe cardamines, Gnophria rubricollis, Euchelia jacobææ, Nemeophila russula, Spilosoma menthastri, Boarmia repandata, Scodiona belgiaria, Ematurga atomaria, Aspilates strigillaria, Lomaspilis marginata, Camptogramma bilineata, Botys fuscalis, Scopula ferrugalis, Crambus pratellus, Bactra lanceolana.* At GLENGARIFF, *Angerona prunaria* was taken.

Melitœa aurinia, Rott.—This butterfly was abundant at Berehaven. In low-lying meadows the typeform occurred, but on the slopes of Slieve Mishkish and at Adrigole the cream-coloured var. *hibernica,* Birchall (*scotica,* Kane) was found.

Cœnonympha typhon, Rott.—Common around Berehaven and Adrigole, both on low-lying moors and on the mountains, often in company with *C. pamphilus.* The presence of this butterfly, which in Great Britain does not range south of North Wales and Derbyshire, in the extreme south of Ireland is a striking instance of the northern element in the fauna of the district.

Gnophria rubricollis, L.—Berehaven; a specimen of this local moth was taken in the wood of Dunboy.

Nemeophila russula, L.—Berehaven; common on the elevated moors of Slieve Mishkish and Adrigole.

Mamestra furva, Hb.—Coolmore; a northern locality for this species is of interest as Birchall recorded it only for Co. Dublin. Dr. Scharff took it at Bundoran in August, 1889, Mr. Johnson in July, 1890, as well as at Carlingford in August, 1888.

Apamea leucostigma, Hb.—Coolmore; apparently a local species in Ireland, though widespread.

Tæniocampa munda, Esp.—Cavan. Killarney is the only locality given by Birchall.

Xylina ornithopus, Rott.—Cavan. This species also is only recorded for southern localities—Killarney and Wicklow—by Birchall.

Camptogramma bilineata, L.—The ordinary form of this common moth was taken at Coolmore and Castletown, but on Dursey a remarkable melanistic variety was found, in which the yellow of both fore and hind wings is largely replaced by a rich chestnut, a narrow transverse ochreous band between the second and subterminal white lines alone being left.

Pelurga comitata, L. } Coolmore. Birchall recorded these moths
Scopula lutealis, Hb. } from Howth. Also occur at Armagh.

Platyptilia ochrodactyla, Hb.—Coolmore. Recorded from Cos. Dublin and Cork. Occurs at Armagh.

Argyrotoza conwayana, Fb.—Coolmore. Taken by Birchall in Cos. Wicklow and Galway. Occurs at Armagh.

Catoptria cana, Haw.—Coolmore. Only recorded from Howth by Birchall. Occurs at Armagh

Eupœcilia atricapitana, Steph.—Coolmore. Apparently not previously recorded for the coast of Ulster.

HYMENOPTERA.

The only family of this order to which any attention was given were the Ants, of which the following four species were taken.

Formica fusca, Latr.—Killarney. Berehaven.

Lasius flavus, D. G.—Coolmore. Killarney. Berehaven.

L. niger, L.—Berehaven.

Myrmica rubra, L., race **ruginodis,** Nyl.—Coolmore. Killarney Berehaven.

race **scabrinodis,** Nyl.—Coolmore. Berehaven.

race **lævinodis,** Nyl.—Coolmore.

PROCEEDINGS OF IRISH SOCIETIES.

Royal Zoological Society.

Recent donations comprise a mongoose from Mrs. Taylor; a seal from R. Chambers, Esq.; a Cow-bird, a Red-headed Cardinal, a pair of Pekin Bantams, and two Wax-bills from J. B. O'Callaghan, Esq.; three Corn-crakes from J. A. Curran, Esq.; a pair of Long-eared Owls from L. Owens, Esq.; a pair of Canadian Ducks from H. M. Barton, Esq.; four Rabbits from Master R. L. Weldon; three Turtle-doves from C. J. Wallace, Esq.; and a Water-rail from Mr. Keegan. A Golden Agouti, two Java Peacocks, and two Wallabys have been acquired by purchase.

15,780 persons visited the Gardens in July.

Dublin Microscopical Club.

June 21st.—The Club met at Mr. F. W. Moore's.

Prof. T. Johnson exhibited *Litosiphon laminariæ*, Harv., a brown seaweed to be found growing in small tufts, epiphytically on *Alaria esculenta*, Grev., near low-water mark all round the Irish coast. The interest of the specimen was that it showed plurilocular sporangia, hitherto unobserved, and filaments bearing unilocular sporangia also, an unusual feature in any brown alga. Comparison of the species with *Pogotrichum hibernicum*, Johnson, was made.

Dr. M'Weeney showed a slide of a curious species of *Fusarium* that occurred in a zooglœa on the surface of a specially-devised nutrient liquid which had been sterilised and then inoculated with a small trace of solid sewage sludge. In addition to the usual sickle-shaped, triseptate spores, smaller oval ones occurred intercalated on the mycelium, as well as terminally, on exceedingly thin, lateral, alternating branches. Mixed with the hyphæ, but not organically connected therewith, were very numerous circular resting-spore-like bodies with two thick, highly-refractive coats, and a relatively small amount of granular protoplasm in the centre. Many of these bodies attained a diameter of 20μ, and were surrounded by a sort of halo of finely granular mucoid-looking material. Thousands of such bodies occurred in the zooglœa, giving it a peculiar opaque and patchy appearance to the naked eye. The mass of the zooglœa was made up of the *Fusarium*, the bodies just described, and bacteria. The only other organism present was a sort of uniflagellate monadine, which jerked about with great rapidity, and was to be seen in various stages of division, first into two, then into four segments, each of which assumed a flagellum, and after rotating together with the others within a highly transparent cyst wall, ultimately became free. Fortified by the opinion of Prof. Marcus Hartog, to whom he had submitted fresh preparations, the exhibitor was inclined to regard the thick-walled "resting-spore" as part of the monadine's cycle of development rather than as belonging to the *Fusarium*, with which it was certainly closely intermixed, but, even with the best lenses, not organically connected. The double wall of the object gave no cellulose reaction. The central protoplasm had been seen to escape as an amœoid body through the inner wall, but had not been seen to emerge through the outer covering.

Mr. M'Ardle exhibited *Jungermania attenuata*, Lindenberg, an addition to the list of Irish Hepaticæ, which he collected in some quantity on the hill of Howth in April and May of the present year, growing on peaty soil amongst limestone rocks in company with *Tetraphis pellucida*, Hedwig, a pretty minute moss, with filiform erect stems, which has not been previously reported from the County Dublin. Mr. W. H. Pearson, of Manchester, who verified Mr. M'Ardle's specimens of the liverwort, states that he believes *Jungermania gracilis*, Schleich., has priority over *attenuata*, Lindenberg, which is a pity, as the latter name is far the better.

Plants growing in dense dark green patches, stems from one-quarter to nearly one inch in length, lower half nearly procumbent, radiculose, leaves large, patent, roundish, concave, divided into two to four teeth, innovations from upper half sub-cylindrical, leaves closely imbricate, ovate, nearly quadrate, irregularly toothed or crenulated at apex, stipules (underleaves) small ovate entire, often absent.

Jungermania barbata, B. *minor*, Hook., Brit. Jung., t. 70, fig. 18-22; *J. attenuata*, Lindenberg, Hepat. Europ., p. 48, No. 44; Dumort Hepat. Europ. p. 71; Cooke's Handbook of British Hepaticæ, p. 179; *J. attenuata*, Carrington and Pearson Hepat. Brit. Exiccatæ No. 74, from Abbey Wood, Kent (E. M. Holmes) *vera*. In Herb. Trinity College, Dublin, under *Jungermania intermedia*, Yorkshire (West legit.) Also found in Germany and Switzerland.

Prof. Grenville A. J. Cole showed a section of Chert from the Aptian sandstone (Hythe Beds) of Leith Hill, Surrey. The chalcedonic silica has collected round the quartz-grains of the sand, firmly cementing them, and includes also numerous grains of glauconite. The chief interest, however, centres in the abundant glauconitic casts of the tubules of hexactinellid and tetractinellid sponge-spicules, which have been left behind as evidence of the spicular origin of the silica which now exists in the form of chert. In some cases the original spicule remains round about the internal cast. The casts are often larger in cross-section than the normal tubules of sponge-spicules, owing to the enlargement of the tubules by solution prior to the infiltration of the glauconite.

Mr. Duerden exhibited *Plumularia similis*, Hincks, a rather rare hydroid obtained from shore-collections made between Laytown and the mouth of the River Boyne, on the occasion of the recent visit of the Dublin Naturalists' Field Club. It has only previously been recorded in Ireland from Dublin Bay and Donaghadee.

Belfast Natural History and Philosophical Society.

June 11th.—Annual Meeting. The President (Prof. Fitzgerald, C.E.) in the chair. The Secretary (R. M. Young, M.R.I.A.) read the annual report, which was passed on the motion of Mr. J. H. Davies, seconded by Dr. M'Cormac. The Secretary read a list of the lectures which will be given in Belfast next winter in connection with the Gilchrist Trust. Prof. Fitzgerald having expressed his wish to retire from the office of President, a vote of thanks to him for his services was passed, on the motion of Mr. R. Lloyd Patterson, seconded by Mr. Workman. At a meeting of the Council held subsequently, Mr. R. Lloyd Patterson was elected President for the ensuing year; the other officers resumed office.

NOTES.

BOTANY.

PHANEROGAMS.

A New Irish Bramble.—In the *Journal of Botany* for July Rev. E. F. Linton publishes, under the name of *Rubus Rogersii*, a description of a bramble allied to *R. plicatus*, *opacus*, *nitidus*, and *affinis*, which he considers distinct, and names in honour of Rev. W. Moyle Rogers, who has done so much to aid the study of British brambles. One of its five known stations is in Ireland—Saintfield, Co. Down, where it was collected last year by Rev. C. H. Waddell.

Carex axillaris and Filago minima in Co. Dublin.—Towards the end of July last, while availing myself of permission kindly granted me by the Great Northern Railway Company to examine the embankments of their line within the Co. Dublin, I had the good fortune to come across a few large tufts of *Carex axillaris* (Good.) in marshy ground near Malahide. This rare sedge has been regarded as a hybrid between *C. remota* and *C. muricata*; but in this station, though the first of the reputed parents was present in abundance, accompanied by *C. vulpina* and *C. divulsa*, *C. muricata*, a species I have long sought for without success in the Co. Dublin, was quite absent. Mr. A. G. More, to whom I have submitted specimens, prefers to regard the plant as a product of *C. remota* and *C. vulpina*. There is no previous record of *C. axillaris* in Co. Dublin, and elsewhere in Ireland it appears to have been observed in only one station in addition to those given in *Cybele Hibernica* and Mr. More's *Recent Additions to the Flora of Ireland*, on the Upper Barrow, in Queen's Co., where it was found by Mr. Hart in 1884. (See *Jour. of Bot.*, Jan., 1885).

For *Filago minima*, a rather uncommon species in Ireland, there seems to be no Co. Dublin station on record, so that it may be of interest to note here its occurrence in considerable quantity at Balalley, near the Three Rock mountain, where I found it growing amongst the *debris* of a granite quarry in July last.—NATHANIEL COLGAN, Dublin.

ZOOLOGY.

PYCNOGONIDA.

Further Irish Localities for Pycnogons.—On page 67 of the present volume I recorded an additional locality for *Anoplodactylus petiolatus*. I have since received from Mr. J. E. Duerden numerous specimens of both sexes of this species dredged by the Harlequin in yet two other stations—one (222), Boylash Bay, Co. Donegal, 20 fms. sand; the other (148) to the south of Aran Islands, 39 fms. sand. This species is therefore known to range along nearly the whole of the west coast.

Mr. Duerden has also kindly handed me some pycnogons collected by him in the rock pools of Dursey in May, 1893. The species represented are *Pycnogonum littorale*, *Phoxichilidium femoratum*, *Nymphon gracile*, and *N. rubrum*; the last had hitherto been known only from the east coast.

From Mr. H. H. Dixon I have received *Nymphon gallicum* taken in Smerwick Harbour.

A specimen of *Chætonymphon hirtum*, Fab., taken off Dalkey Island by the late Dr. Kinahan, has recently come to light in the museum. Rev. Canon Norman has recently (*Ann. M. N. H.*, Feb., 1894.) given good reasons for reckoning *C. spinosum*, Goods. (which Thompson recorded from Belfast Bay) as a synonym of this species.—GEO. H. CARPENTER.

INSECTS.

Vespa arborea, Sm. in Co. Dublin.—In the *Irish Naturalist* for July (p. 157), I mentioned that this rare wasp was not among those taken this spring at Bray by Mr. Barrington. During June and July however it occurred at two localities in Co. Dublin, Mr. H. B. Rathborne taking a queen at Dunsink, and Mr. G. Low two at Dundrum. These latter are remarkable in having the yellow line on the scape of the antenne almost obsolete, but in all other respects they are typical. Mr. E. Saunders, in his work on British Hymenoptera now appearing, states that this wasp is a variety of *V. austriaca*, Panz., by which name it will therefore henceforth be known. It is to be hoped the male, and as yet unknown worker, may soon be found.—GEO. H. CARPENTER.

Coleoptera in Co. Dublin.—The following is a list of some beetles recently taken by me about Dublin, given with the intention of recording a few species new to the district, or Ireland, and of supplying additional localities for some already recorded. *Elaphrus cupreus*, Dodder bank, Friarstown Glen, locally common; *Leistus rufescens*, Santry; *Dromius quadrinotatus*, Enniskerry, and under hawthorn bark, Phœnix Park, much rarer than *quadrimaculatus*; *Chlœnius nigricornis*, Dodder bank, Friarstown Glen; *Olisthopus rotundatus*, common under stones on Howth; *Cillenus lateralis*, shore near Sutton, under sea-weed, previously recorded by Mr. Haliday both from this district and the south-west coast of Ireland; *Bembidium rufescens*, Tolka Valley, under hawthorn bark; *B. atrocœruleum*, Royal Canal bank (new to Dublin list); *Cœlambus quinquelineatus*, Royal Canal, Santry, Raheny, etc., frequent; *Deronectes assimilis*, in the spring of last year this beetle was very common in the Royal Canal near Dublin, it seemed not to be so common this season; *Deronectes xii.-pustulatus*, Dodder, near Dublin (Dr. Scharff took it last May in the quarries near Raheny); *Enochrus bicolor*, I found a specimen last summer in the old quarries at Raheny and again last May (it does not seem to have been previously recorded from Ireland); *Laccobius sinuatus*, in moss from Dodder bank, Terenure; *Tachyporus obtusus* var. *nitidicollis*, Santry, etc., common. *Quedius cinctus*, and *Q. molochinus*, under stones, in moss, etc., plantations, Mt. Pelier, Dublin mountains; in the same locality last autumn I took a specimen of *Q. picipes*, a species as far as I can ascertain not previously noted as Irish. *Xantholinus glabratus* and *X. tricolor*, both occurred on the Scalp; *Stenus flavipes*, Santry, etc., frequent; *S. cicindeloides*, two specimens in moss from Portmarnock (both species new to Dublin list); *Philorinum sordidum*, Howth; *Scaphisoma agaricinum*, in a rotten stump, Woodlands near Lucan; *Necrophorus mortuorum*, I found a specimen some years ago at Tibradden; *Hippodamia xiii.-punctata*, Woodlands; *Adalia obliterata*, common by sweeping under Conifers, Santry, Lucan, etc.; *Halyzia xvi.-guttata*, off Conifers, in the Lucan demense; *H. xviii.-guttata*, Tolka Valley, Phœnix Park, etc., much rarer than H. *xiv.-guttata*; *H. xxii.-punctata*, frequent, Santry, Portmarnock (very common), etc., *Telmatophilus caricis*, quarries near Raheny, sweeping; *Paramecosoma melanocephalum*, one specimen in flood-refuse from Tolka (both this and the former species are new to the Dublin list); *Aphodius rufescens*, Scalp, etc.; *A. porcus*, Woodlands, one specimen (new to Dublin list); *Geotrupes spiniger*, near Dublin; *Corymbites quercus*, occurred in the Lucan demesne; *Telephorus nigricans* var. *discoideus*, by sweeping at the edge of a small stream, Tibradden; *Telephorus thoracicus*, Royal Canal bank near Blanchardstown, a local species in England (new to Dublin list); *Malthodes atomus*, Santry, a few specimens, sweeping low plants; *Priobium castaneum*, Malahide; *Gastrophysa polygoni*, local, Santry, Tallaght, etc.; *Lochmœa suturalis*, Howth and Bray Head; *Crepidodera rufipes*, locally common, Lucan, etc.; *Psylliodes cuprea*, Portmarnock; *Cassida flaveola*, Santry, sweeping, last June (new to Dublin list); *Crypticus quisquilius*, shore near Sutton; *Salpingus castaneus*, Santry, one specimen, sweeping under Conifers (new to Ireland); *S. æratus*, local, Tibradden and Blanchardstown; *Rhinosimus ruficollis* and *R. viridipennis*, Santry, under moss on an old tree stump, last December (the former is new to Dublin, and the latter, of which only two specimens occurred, is apparently new to Ireland); *Otiorrhynchus maurus*, locally abundant, Santry, Portmarnock, etc., I noticed it very common last summer; *Barypeithes sulcifrons*, Boh., one specimen, Woodlands; *Polydrusus chrysomela*, several last May, from under stones at one spot on the shore, near Sutton, a little above high-water mark, it is, I think, very local, and only occurred to me at the one place (I cannot find any previous Irish record for this interesting species, but I believe Mr. Ray Hardy has taken it in Co. Kerry). *Phyllobius pomonæ*, Portmarnock; *Barynotus Schonherri*, Royal Canal bank; *B. elevatus*, in moss from Santry; *Hypera pollux*, Santry,

rarer than *H. rumicis*; *H. trilineatus*, Tallaght. *Orchestes ilicis*, occurred twice in the Lucan Demesne (new to Ireland); *Bagous alismatis*, occurred in the Royal Canal, last summer; *Gymnetron labilis*, in numbers on a railway bank near Portmarnock (new to Dublin list); *Anthonomus ulmi*, Portmarnock; *A. rubi*, frequent, Lucan, etc.; *Ceuthorrhynchus ericæ*, Howth and Bray Head, common; *C. litura*, I obtained this species off thistles, in several localities, Portmarnock, Santry, Castleknock, etc.; Mr. Cuthbert has taken it at Maynooth, and Rev. W. F. Johnson in Co. Donegal; it is remarkable how such a conspicuous insect could have been so long overlooked; *Ceuthorrhynchidius floralis*, in moss, Dodder bank, Terenure; *Eubrychius velatus*, I found this interesting species at Santry by sweeping near a pond, in early summer, and again, last November, it occurred in large numbers in the chinks and under the bark of pieces of wood left on the mud at the edge of the pond (new to the Dublin list); *Magdalis armigera*, Santry last summer I took one specimen off a young birch tree, and recently another off elm. (I cannot find any other Irish record). Its occurrence on the above-mentioned trees is worth recording, as in England it is usually obtained in dead twigs and hedges.—J. N. HALBERT, Dublin.

BIRDS.

Flock of Wild Geese at Kingstown.—When on the platform of the Kingstown railway station on Friday the 21st ult., during the regatta, my attention was called to a flock of Wild Geese which was passing over the Club House (R. St. George), going S.E. There were seven geese going in single file. It is the first flock I have seen under the circumstances, and the passage of these birds during the month of July may be a matter worth bringing under the notice of naturalists; hence my short note.—J. P. O'REILLY, Dublin.

Sand Martins nesting in a Ruin.—Mr. R. Warren writes to *Zoologist* for August that during last week in June he observed a number of Sand Martins nesting in deep crevices between the stones of the ruined castle on Garrison Island, Lough Cullen, Co. Mayo.

GEOLOGY.

Ctenacanthus denticulatus, M'Coy.—To the geological collection of Belfast Museum there has lately been added a specimen of a fossil fish spine representing *Ctenacanthus denticulatus*. M'Coy. For this species the late Mr. Davis, in his valuable monograph of the fishes of the British Carboniferous Limestone, records only one locality, namely—"Monaduff, Drumlist, North of Ireland,"[1] Monaduff is not in the North of Ireland: the correct citation is Monaduff, Drumlish, Co. Longford. The Memoirs of the Irish Geological Survey give us very little palæontological information as to this place. They do not record this species, but mention is made of undetermined fragments of fish remains at Monaduff. The exact locality is Monaduff, quarries on south side of road to Arvagh, about two miles north-east of Drumlish. The specimen now in Belfast Museum is from the Carboniferous shales at Cultra, Co. Down. It is from the collection of the late James MacAdam, F.G.S., and has been presented by his brother, Mr. Robert MacAdam. The genus *Ctenacanthus* is stated by Davis to occur only in the shales underlying the Coal Measures and this holds good so far as our specimen is concerned. The rocks at Monaduff are described in the Survey memoir as dark gray sandy shales and flags, a description which answers equally well for the Cultra locality. Another resemblance is the occurrence of *Modiola MacAdamii* at Monaduff, so that both lithological and palæontological characters indicate that the beds exposed in Longford and in Down are of similar age.—S. A. STEWART, Belfast.

[1] Davis, *Scient. Trans., Roy. Dublin Soc.*, part 25, 1883.

The Irish Naturalist.

Vol. III. OCTOBER, 1894. No. 10.

RARE PLANTS IN WEST CORK.

BY R. A. PHILLIPS.

DURING the last fortnight in July, I spent a few days in the neighbourhood of Castletown-Berehaven and Adrigole, with the object of collecting, and to see growing for myself some of the very rare plants which have been recorded from that district.

On my first day at Castletown I visited the pretty little waterfall of Millcove, about one and a-half miles from the town, and in the wood through which the fall is approached was agreeably surprised to see on a damp spot, a luxuriant patch of *Juncus tenuis*, Willd. The following day I again found the same plant in a very similar habitat in the woods at Dunboy, about four miles south-west of the last station. In both of these localities the rush grew sparingly. During the next few days I met with it in abundance near Adrigole, about eight miles east of the first station. Here it was not so luxuriant as in the woods, and occurred principally on damp roadsides, and bare spots by the sides of streams, not in the turf, associated with such plants as *Cicendia filiformis*, *Anthemis nobilis*, *Eufragia viscosa*, *Scutellaria minor*, *Juncus bufonius*, and *J. lamprocarpus*.

This is one of the rarest of British plants, and in Ireland has hitherto been known to exist only in a few places along the estuary of the Kenmare River, where it was first found by Mr. R. W. Scully, and it is with much pleasure that I now record it as an addition to the Flora of Co. Cork.

The other plants which I noticed have all been recorded from the county before, but some of them are new to the Castletown district. Among the more interesting may be mentioned *Arbutus Unedo* and *Trichomanes radicans*, two species which are probably on the eve of extinction in Cork. Of the first I saw seven trees on Adrigole Mountain; they all

grew in the clefts of high rocks, and, as might be expected in such situations, were rather stunted in appearance.

The *Trichomanes* I saw growing sparingly on two mountains near Adrigole. This beautiful fern and its value are now well-known to every peasant in the district, and many places were pointed out to me from which it has been exterminated within the last few years.

Near Adrigole I discovered a new station for *Asplenium lanceolatum*, but lest it should, like the Killarney Fern, suffer the penalty of its rarity, and fall a prey to the Glengariff guides and tourists, it will perhaps be better not to describe the exact locality.

On the mountains and also near the sea-level, *Saxifraga umbrosa*, *S. hirsuta*, and *S. Geum* were abundant, and on Hungry Hill were quantities of *Saxifraga stellaris*, which in this station assumes a large, hairy form, very different in appearance from English and other specimens I have seen. It was in a viviparous condition on wet rocks at about 1,000 feet, and particularly luxuriant on the turfy sides of a stream which runs through the bog at the summit of the mountain. On Hungry Hill I also gathered *Sedum Rhodiola*, *Solidago virgaurea* var. *cambrica*, *Antennaria dioica*, *Lobelia Dortmanna*, *Campanula rotundifolia*, *Melampyrum pratense* (a peculiar dwarf variety), *Pinguicula vulgaris*, *Littorella lacustris*, *Empetrum nigrum*, *Eriophorum vaginatum*, *Hymenophyllum Wilsoni*, *Lycopodium Selago* and *Isoetes lacustris*.

On the lowland bogs and pastures were to be seen in abundance *Drosera intermedia*, *Hypericum elodes*, *Cicendia filiformis*, *Eufragia viscosa*, *Scutellaria minor*, *Pinguicula grandiflora*, *P. lusitanica*, *Euphorbia hiberna* (well known in the district by the name of "Bonnik-æan"), *Rhynchospora fusca*, *R. alba*, *Carex extensa*, *Lastrea æmula*, and, not quite so plentiful, the white varieties of *Calluna vulgaris* and *Erica tetralix*, *Carex punctata*, and *Lastrea Oreopteris*.

The most notable wayside plants were *Chelidonium majus* (near a house), *Silene anglica*, *Agrimonia odorata*, and *Anthemis nobilis*.

Such are a few of the rarities observed during a short stay in a district which is as full of interest for the lover of the picturesque and the antiquary as it is for the lover of nature.

THE CROSSBILL AT BALLYHYLAND, CO. WEXFORD.

BY C. B. MOFFAT.

ACCORDING to Mr. Ussher's recent report on the breeding range of birds in Ireland (*R.I.A. Proc.*, (3), vol. iii.), the large numbers of Crossbills observed in this country in 1888-90 have diminished. As the Crossbill is now (August, 1894) more plentiful in this part of the County Wexford than I have ever before known it, I think a few notes on the subject of its visitations to our neighbourhood may be worth communicating.

During the period indicated as that of the Crossbill's maximum abundance in Ireland (1888-90), I saw it at Ballyhyland but once, viz., in October, 1889, when I came on a company of some fifteen birds eating Larch-seed in trees by a roadside. But a flock of ten which I saw similarly employed in the woods on January 15th, 1891, may, for aught I know, have previously frequented the vicinity for great part of the autumn and winter months of 1890, during which I had been absent and could not have discovered them. Again leaving for Dublin on January 17th, not to return till mid-June, I saw no more of these birds ; and careful search during the summer and winter of 1891 failed to give any indications of their presence.

But on August 12th, 1892, noticing a footpath strewn with green Larch-cones freshly hacked after the characteristic manner of the Crossbill, I looked around more carefully, and in a few minutes saw a party of the birds feeding near me. Further investigation during the next few days revealed the presence of several small flocks of Crossbills in different parts of the woods. There were companies of seventeen, of twelve, of three, and probably others, each party having its favourite feeding grounds, where it might be found almost at stated hours daily. The regularly-frequented trees were all Larches. At odd times I saw a few Crossbills making a meal of Scotch Fir-cones, or lighting on little patches of ground sprinkled over with the débris of such a feast. But at no time of their residence with us, which lasted for at least five months, and probably longer, did they make more than an occasional repast in any coniferous tree except the Larch.

I had many opportunities of watching these birds during August, September, and October, and again (after a two

months' absence on my own part) during some weeks of December and January. By New Year's Day or thereabouts several males had begun their song, and I hoped they would breed. However I left the place too soon to make sure, and when I returned, late in July, all the Crossbills had vanished. From the somewhat recent aspect of the litter they had left in two or three spots, I thought it likely enough that some had stayed through the nesting-season.

Between July, 1893, and July, 1894, though not at Ballyhyland except now and then for a few days at a time, I think I am safe in saying there were no Crossbills resident here. In June last a few Larch-cones marked with their recognizable imprint suggested that a family party had travelled by and snatched a meal *en passant*, but nothing more. I was therefore agreeably surprised, after coming down here on the evening of July 28th, in the present year, to see next day four Crossbills fly across the avenue. Going into the woods on the day following, I immediately came on another party of three. Shortly after a flock of some thirty passed overhead, and numerous patches of ground strewn with the recently broken green cones of the Larch plainly told that Crossbills had returned in full force. In fact it was very soon apparent that their forces had much increased since 1892, for though most of the parties observed were small (twos, threes, fours, fives, &c.), the wild "chip, chip, chip" of the bird was continually calling attention to its presence, as a little company flitted from one feeding station to another; and it was quite impossible to form an estimate of the number of such small family parties, as I found them in every plantation in the neighbourhood.

These details may seem dry and unsuggestive, but they are not, I believe, without their bearing on the history of the Crossbill's migrations. During the summer of 1890 the harvest of Larch-cones at Ballyhyland was abundant, and the birds which I saw in the course of the ensuing winter were evidently making these cones their staple diet. In 1891, on the contrary, the Larches very generally failed to produce cones,—as the Beeches, the same year, totally failed to bear mast,—and though Pine-cones were as plentiful as usual we had no Crossbills that season. In 1892 the crop of green Larch-cones was abundant, and the Crossbills returned, remaining the autumn and winter, and possibly the spring. But in 1893

again the Larches were unproductive, and by July the Crossbills had left us, not to appear certainly earlier than June, 1894. This summer we have again a rich abundance of Larch-cones, and here we have again the Crossbills feasting upon them, in greater numbers than ever.

Thus the experience of five seasons tends strongly to confirm the view that the Crossbill's migratory movements are determined by local variations in the supply of its favourite diet. The cones of *Pinus sylvestris* (the Scotch Fir) have been plentiful every year at Ballyhyland during the period under notice. Hence it is clear that the Crossbill (whose Scandinavian kinsmen have to subsist mainly on cones of this pine) was not seriously pressed for food, but was merely gratifying a preference in quitting our woods in 1891 and 1893 for other haunts, where he may have found Larch-cones in sufficient abundance for his liking.

So full an account of this bird's habits has already been given in the pages of the *Irish Naturalist* (vol. i., p. 8., &c.), by Mr. R. J. Ussher that I am reluctant to occupy space with further details. But I subjoin a few observations with reference to its feeding habits, because these afford much the readiest indications of the bird's presence in any given locality, and because I have reason to think the Crossbill, in spite of its brilliant plumage, tame character, and noisy manner during flight, is still a bird which very commonly eludes observation, even in districts where its stay has been more or less protracted.

The crackling noise which Crossbills make in the trees when a number of them are feeding is frequently alluded to, but it should be added that this is audible as a rule only in winter, when the cone-scales are crisp ; and during the summer months any person unaccustomed to distinguish birds by their call-notes is likely to overlook the presence of even a considerable number of Crossbills, unless he observes and guesses at the meaning of the litter of cones under their feeding-trees,—an unfailing clue, when once understood.

The only other common denizens of our woods which habitually wrench off entire cones before proceeding to extract their seed are the Rook and the Squirrel, both of which act quite differently from the Crossbill, as well as from one another. The Rook carries off the green cones of the Scotch

Fir in large numbers, and hacks away the exterior bit by bit, so clumsily that one may pick up a dozen on which he has operated without finding one whose seeds he has reached. The Squirrel's mode is to snip off the scales, dropping a denuded core to the earth. The Crossbill pursues a method peculiar to himself. The cone which he lets fall, if a Larch cone, is marked simply by two longitudinal gashes cut from near the centre to the edge of each scale. If a Pine-cone, it presents an aspect more illustrative of the bird's mechanical power—the scales being all completely loosened, and hanging disjointedly like the appendages of a rattle. At first sight one would imagine that totally different methods had been employed in extracting the seeds of the two trees. The difference, however, is not in the Crossbill's *modus operandi*, but in the stage at which the scales of the cone yield to it. Those of the Larch (as might be expected of a tree whose seeds the Goldfinch, Siskin and Lesser Redpole so easily extract) at once suffer the points of the Crossbill's inserted mandibles to pierce their tissue, and thus escape being loosened at the base by main pressure. The toughness of the Pine-scale is the *raison d'être* of the Crossbill's peculiar formation, and the same act on the bird's part which rends into ribbons the scale of the Larch merely disturbs and forces upwards that of the Pine.

On one unimportant particular, I must venture to differ from Mr. Ussher, who states (*Irish Nat.*, vol. i., p. 9) that a Crossbill commences to work a cone at the apex. I have watched the operation many times, and have invariably found the commencement to be at the base of the cone. I have also picked up scores of cones which had been dropped unfinished ; in all these, without exception, the scales of the large end had been lacerated, and those at the small end left entire.

In September, 1892, I was for some time much puzzled over the voice of a bird I heard singing in the woods by night, at full moon. Eventually it proved to be the Crossbill, to whose

" Songs, like legends, strange to hear,"

I thus listened, for the first time, under somewhat unwonted conditions.

THE IRISH FIELD CLUBS.

BY R. LLOYD PRAEGER, B.E.,
Secretary, Dublin Nat. Field Club; Ex-Secretary, Belfast Nat. Field Club.

II.—THE DUBLIN NATURALISTS' FIELD CLUB.

It might have been more appropriate that this short history of the Dublin Field Club should have been written by Professor Haddon, its founder, or by some other of the eminent men of science who have watched over it from its infancy, and still take an active interest in its welfare; but though I cannot write of the early days of the Club from personal recollection, the minute-book lies open before me, so I trust that at least I shall not err as to fact, however wanting my account may be in regard to sentiment.

The conditions under which the Dublin Club came into existence were widely different from those which I have already described as attending the birth of the Field Club of Belfast. Firstly, there was the lapse of nearly a quarter of a century, bringing with it a more general interest in, and sympathy with science, and scientific research. And secondly, Dublin had the good fortune to possess a comparatively large body of trained scientific men, and also societies, schools, and museums eminently favourable to the acquisition of scientific knowledge—advantages which were almost entirely wanting when the hard-working citizens of the northern capital founded their Club. It is quite possible, however, that the foregoing circumstances had a deterrent effect as regards the founding of a Field Club in Dublin, for, while they were undoubtedly conducive to the imparting of a more general interest in science, and of a love of natural history pursuits, they at the same time supplied, partially at least, the opportunity for scientific intercourse and study which it is the main object of a Naturalists' Field Club to confer, and rendered less necessary the banding together of persons scientifically inclined, for the promotion of their favourite pursuits.

However this may be, it was early in the winter of 1885-6 that Professor Haddon, of the Royal College of Science, suggested the formation in Dublin of a Naturalists' Field Club, and the suggestion appears to have met with immediate favour. A preliminary meeting was held by private invitation in the

biological laboratory of the College of Science on December 18th, about twenty persons being present, and it was followed by a public meeting, convened by advertisement, in the theatre of the Royal Dublin Society on January 11th. Dr. E. Perceval Wright occupied the chair, and a provisional code of rules, which had been framed on those of the Belfast Club, was adopted, and officers for the ensuing year were elected. The first President was Professor Wright; Vice-president, Professor Haddon; Secretary, Greenwood Pim; Treasurer, R. M. Barrington; Committee, Wm. Archer, V. Ball, F. W. Burbidge, Rev. M. H. Close, H. C. Hart, W. F. de V. Kane, F. W. Moore, A. G. More, Professor M'Nab, Professor O'Reilly, Professor Sigerson. The list of members who entered their names at this meeting numbers 99, and the Club entered on its career with every indication of success. The Royal Irish Academy generously placed their fine rooms at the disposal of the Club for the purpose of evening meetings, a privilege which the Club has enjoyed ever since, and which is duly appreciated. The first summer excursion was made to Howth on May 22nd, and was attended by about 75 persons, a number which has not, I believe, been equalled on any excursion held since. The first annual report of the Committee, laid before the members at the annual meeting held on 22nd January, 1887, shows that five evening meetings were held during the year, and five excursions, one excursion being abandoned owing to bad weather. The membership stood at 172; the officers, with the exception of three of the Committee, were re-elected; and the Club entered on the second year of its existence.

The novelty of the excursions and evening meetings had by this time worn off, and at the close of a rather uneventful year it is not surprising to find the Committee, in their second annual report, urging strongly on members the desirability of showing a more active interest in the Club's operations. With Mr. Greenwood Pim as President, Dr. M'Weeney as Secretary, and a decreasing membership of 149, the Club commenced its third year, which was destined to bring with it a severe crisis in the Society's fortunes. The attendance of members at the excursions of this season (1888) was so unsatisfactory that after due deliberation the Committee determined to bring before the members a resolution authorizing the winding up of

the Club, "in order (to use the words of the ensuing annual report) to ascertain whether they set any value on its continued existence," and this was done at a general meeting held on 20th November, 1888. This momentous action proved the turning-point of the Club's fortunes. The resolution was vigorously opposed by a number of members, offers of assistance at the coming winter meetings were tendered, and so evidently was the feeling of the meeting against the termination of the Club's existence, that the resolution was withdrawn. At the succeeding evening meeting the attendance of members was considerably larger, and the greater interest shown in the agenda proved that the dormant energy of the members had been aroused.

The third annual meeting was held in January, 1889. The report then presented contained, of course, a full reference to the critical events of the previous year; beyond this, there was but little to call for remark, so much had the lack of interest shown by members hampered the usefulness of the operations of the Club. At this meeting, Dr. Scharff succeeded Dr. M'Weeney as Secretary; the other officers were re-elected; the membership was reported as 94.

The fourth year of the Club's existence brought a decided revival of interest among members. The attendance at winter meetings showed an encouraging increase, as also did the list of members who read papers or exhibited objects of scientific interest; and the summer excursions also received an augmented amount of support; so that the Committee were able to render at the end of the year a satisfactory account of their stewardship, and to report, for the first time since the foundation of the Club, a slight increase of membership. At the beginning of the fifth year (1890), Professor Haddon succeeded Mr. Pim as President; the Secretaryship devolved on Mr. G. H. Carpenter; and Mr. Barrington relinquished the post of Treasurer, which he had held since the Club was founded, Mr. R. S. Chandlee being elected in his place. Thus officered, the Club continued to make satisfactory progress. The excursion programme was successfully carried out, with an average attendance of about 35 members; during this year there was an increase both in the number of excursions held and in the amount of field-work which was done on them; and the attendance at the winter meetings was most satisfactory.

In their report for 1891, presented at the sixth annual meeting, 12th January, 1892, the Committee are again able to record an increase in the roll of members, which now numbers 109. On account of the lamented death of Mr. Chandlee, Mr. J. E. Palmer undertook the duties of Treasurer. It may be noted that in this year the experiment was tried of holding small extra excursions for the study or collecting of particular groups of plants or animals by those specially interested in them. During the first year of the Club's existence a similar scheme had been attempted, a number of sections having been started, each devoted to the study of some special department of natural history; but in neither instance was the scheme carried out for more than a single season; probably a much larger membership would be necessary before such a scattering of the limited scientific resources of a small Field Club would be either advisable or successful.

Dr. M'Weeney was elected President for the year 1892; the other officers were re-elected, and the Club continued to prosper. It was early in this year that the suggestion was made by Mr. Carpenter that a magazine devoted to Irish natural history should be founded; and from the first, the Dublin Field Club showed an active and friendly interest in the undertaking, and the existence of the *Irish Naturalist* in its present form is largely due to their prompt sympathy and generous assistance.

At the beginning of 1893 the Club numbered 126 members; Mr. J. M. Browne succeeded Mr. Carpenter as Secretary, and Professor Johnson, Mr. Palmer as Treasurer. Once again there followed a year of steady progress, the most noticeable events being the opening of the winter session with a Conversazione, which was in every respect successful, and will probably become an important annual event, as it is with the Belfast Club; and a three-day excursion to the neighbourhood of Newry and Carlingford, carried out in conjunction with the Belfast Field Club, which was considered, by those members who had the good fortune to be present, to be one of the most enjoyable and instructive trips which have, so far, been held by either of the Societies engaged.

And this brings us to the beginning of the present year, when Mr. Carpenter succeeded to the Presidential chair, with Professor Cole as Vice, and the present writer was elected to

the vacancy in the Secretaryship caused by the retirement of Mr. Browne. At the commencement of the year the membership was 128; since then, the increase steadily continues, so that at the time of writing it has reached 160. The summer excursions, now drawing to a close, have been enjoyable and instructive, and the pleasant re-unions with the Belfast Club at the Boyne, and with the Cork and Limerick Clubs at Fermoy, will not soon be forgotten. The Dublin Naturalists' Field Club has a successful and useful future before it, and especially hopeful are the prospects of a better knowledge of, and a closer bond of union with our fellow-Clubs of the north and south. May we all feel, and may we be encouraged by the thought, that there is a fair field before us, and that we are fellow-travellers in the march of scientific progress, able and willing to help ourselves and to help each other.

MATRICARIA DISCOIDEA, DC., IN IRELAND.

BY NATHANIEL COLGAN.

On the 22nd of August last, while botanizing in the Dublin Mountains, I gathered an unfamiliar rayless composite growing on a granite freestone track alongside the Rathmines Waterworks Reservoir at the head of Glenasmoil. Two days later, the same plant turned up, quite unexpectedly and in much greater abundance, on the footpath of the Glenamuck road, near Carrickmines, fully seven miles distant from the first station; and, once again, on the 29th August, I came across it growing in an angle of waste ground at Lispopple cross-roads, eighteen miles distant from Glenasmoil. On examination the plant proved to be *Matricaria discoidea*, DC. The Carrickmines specimens agreed perfectly with the description in the *Prodromus* (vi. 50), the seed-apex being naked or obscurely crowned. In the Glenasmoil and Lispopple plants, however, the seed was crowned with two distinct teeth, tightly clasping the floret so as to render it quite persistent. This toothed form of the seed, not mentioned in the *Prodromus*, is well described in Asa Gray's "Flora of North America," 1886, p. 364, where it is stated that the seed-crown "is occasionally produced into one or two conspicuous, oblique auricles of

coriaceous texture," and in my County Dublin specimens this toothed or auricled seed appears to be correlated with a marked difference of habit in the plants which produce it. They are upright and stronger in growth than the variety bearing the uncrowned seeds, which is quite procumbent.

The distribution of the species is thus given by Asa Gray: "West California to Unalaska and Behring Island, E., to Montana, and becoming naturalized in the Atlantic States, near railroad stations (N. Asia and nat. in N. Eur.)" According to Wyman's *Conspectus* the plant occurs in many places in Northern and Middle Europe, where it is thoroughly naturalized. Hartmann ("Skandinaviens Flora," 9 Ed. 1864), records it as then found in streets and cultivated places in Christiana, Upsala and other stations. Willkomm ("Pflanzenreich Deutschlands," 1882), records it from the following German stations: around Berlin, Frankfort-on-Oder, Breslau, Dresden, Prague, and Constance. On consulting the herbarium of the late Dr. Moore in Glasnevin Botanic Gardens, Dublin, I find a specimen of the plant labelled: "Between Richmond and Kew, J. G. Baker, July, '71," so that the plant has been observed in England, in a suspicious locality, indeed, and perhaps as a mere casual, twenty-three years ago. But it does not appear to have gained ground in England, up to 1884, at least; for no mention of the plant is made in the appendix of excluded species in the last edition of Hooker's "Student's Flora." Quite recently (September 3rd), Dr. Leitch, of Silloth, has shown me specimens of a puzzling ballast plant gathered by him at Falmouth on his way by sea from London to Dublin. This plant is undoubtedly *M. discoidea*, DC., and Dr. Leitch tells me it is abundant in the Falmouth station. It would be of no small interest to know what is the present English distribution of the species. In County Dublin it cannot be regarded as a ballast plant, the stations of Carrickmines, Lispopple, and Glenasmoil, being respectively two and a half, four, and ten miles distant from the nearest sea. In all these stations it ripens seed perfectly, and it may be that this interesting, but by no means handsome, stranger has come to stay in Ireland, as it has in Scandinavia and Germany.

IRISH MOTHS.

A Catalogue of the Lepidoptera of Ireland. By W. F. de V. Kane, M.A. *Entomologist*, 1893-4. (Sphinges and Bombyces from September, 1893, to July, 1894.)

Six years' Entomology in Co. Galway. By Hon. R. E. Dillon. *Entomologist*, March, May, and June, 1894.

In the *Irish Naturalist* for March (p. 56) we noticed the commencement of Mr. Kane's valuable list, and summarised the result of his work on the Irish butterflies. By this time he has dealt with the families of moths generally known as "Sphinges and Bombyces," and his account of their Irish representatives will be gladly welcomed by entomologists here and in Great Britain. A comparison of the new list with Birchall's shows that Mr. Kane has found it necessary to expunge not a few erroneous records, as well as to add new species. Of the hundred and fifty-one British Moths in the families under consideration, just a hundred were inserted in the Irish list by Birchall. Two of these—*Ocneria dispar* and *Pygæra anachoreta* owed their places only to caterpillars which the recorder himself turned out, the former on the Killarney moors, the latter at Howth; consequently they have no more right to be considered Irish animals than the Fallow Deer in Phœnix Park, or the Black Swans in St. Stephen's Green, have to rank among the vertebrates of County Dublin. Thirty years ago the importance of an accurate knowledge of animal distribution was not recognised, but to-day a wilful falsification of the geographical record should be considered a serious offence by naturalists; we are somewhat shocked to find that Mr. Kane not only fails to reprobate such a proceeding, but confesses to have himself let loose larvæ of *O. dispar* in County Sligo!

Of the ninety-eight remaining species of the 1866 list, four—*Deilophila euphorbiæ*, *Clisiocampa castrensis*, *Notodonta bicolor*, and *N. trilophus*—were withdrawn by Birchall in 1873, and three others—*Sesia culiciformis*, *Lithosia complana*, and *Sarrothripus undulanus*, were added. Mr. Kane confirms these additions, and re-instates *Notodonta bicolor*. But he omits so many as fifteen of Birchall's moths—*Sesia formiciformis*, *Hepialus lupulinus*, *Nola cucullatella*, *N. strigula*, *Lithosia mesomella*, *Callimorpha dominula*, *Arctia villica*, *Porthesia chrysorrhœa*, *P. similis*, *Psilura monacha*, *Endromis versicolor*, *Lasiocampa trifolii*, *Cymatophora octogesima*, *Asphalia diluta*, and *A. flavicornis*—some of which were even recorded in 1866 as "common." We conclude that Mr. Kane has, in each case, information which has inclined him to regard the determination as untrustworthy, and that he has failed to confirm the insect's occurrence in Ireland by personal observation. It seems however that *Hepialus lupulinus* must be replaced in the list, as Mr. C. G. Barrett states, in the second volume of his work on British Lepidoptera, now in course of publication, that he has himself taken this species in County Galway.

The various additions which have from time to time been made to Birchall's list have been investigated by Mr. Kane, with the result that some, specially among those recorded by the late Mr. Sinclair in the *Sci.*

Proc.. R.D.S., 1879, are rejected as erroneous or untrustworthy, while others are adopted and incorporated. This sifting process is of the greatest value, as a reliable basis is thus afforded upon which future investigators can build.

Against the omissions, Mr. Kane has ten species to add to Birchall's list. These are *Smerinthus tiliae*, *Sesia musciformis*, *Zygæna loniceræ*, *Naclia ancilla*, *Deiopeia pulchella*, *Zeuzera pyrina*, *Macrogaster castaneæ*, *Heterogenea limacodes*, *Dasychira fascelina*, and *Ptilophora plumigera*. No less than six of these are due to the work of Mr. R. E. Dillon at Clonbrock, County Galway, who also has published, in a separate list, his more remarkable captures in that phenomenal locality. The occurrence of some of these species in the West of Ireland is so startling that it is to be regretted that the earlier among them were published by Mr. Kane, without the name of their captor, thus giving an air of mystery to the records, which might lead to doubt on the part of some. We observe, indeed, that Mr. C. G. Barrett has not noticed them in his work, already referred to. It is now, however, a satisfaction to know to whom we are indebted for the discovery of such rarities, and Mr. Dillon may rest assured that the open publication of his work is well worth "the risk of attracting undesirable collectors" which he deprecates. Startling as some of these additions are, Mr. Kane's well-known carefulness is sufficient guarantee that no mistakes have arisen through a mixing of Irish with English or Continental specimens in Mr. Dillon's cabinet.

Of these additions, the most remarkable is *Naclia ancilla*, an insect which appears only in the "reputed" British list on the strength of a single occurrence at Worthing in Sussex. The family—*Syntomidæ*—to which it belongs is otherwise unrepresented in Britain. The circumstances of the capture, in an old oak wood, of Mr. Dillon's two specimens lead Mr. Kane to regard this moth as a truly indigenous species, not—as *Deiopeia pulchella* for example—a chance visitor. The vast amount of deforestation which Ireland has undergone has probably led to the almost total extinction of many woodland insects, the few survivors of which remain to be discovered in favoured or protected localities. Hardly less remarkable is the discovery of *Macrogaster castaneæ* in Co. Galway, considering that in Great Britain it is confined to the eastern fen districts of Norfolk and Cambridgeshire.

Mr. Kane has much of interest to record on the variation of certain species in Ireland. It appears that all our "Galway Burnets" must be referred to the var. *nubigena*, and that the typical *Zygæna pilosellæ* is unknown in Britain, contrary to Birchall's opinion. Specially noteworthy, also, are the remarks on the varieties of *Spilosoma mendica* and *Cymatophora or*.

As with the butterflies, we give a summary of Mr. Kane's list of these families of moths, with a few supplementary localities ; adding *Hepialus lupulinus* on Mr. Barrett's authority, and *Nudaria senex*, which Col. Partridge has taken at Enniskillen (*Ent. Mo. Mag.*, Dec., 1893.) The number of Irish species thus stands at ninety-five, or about sixty-three per cent. of the British species. The proportion among the butterflies is very nearly the same.

In the light of modern researches it is impossible to regard any longer the "Sphinges" and "Bombyces" as natural groups. By the structure of their larvæ and pupæ[1], as well as by their wing-neuration[2], the *Sesiidæ*, *Zygœnidæ*, *Cossidæ*, *Cochliopodidæ*, and *Hepialidæ* are more nearly related to the *Tineidæ* and *Tortricidæ* than to the families near which they at present stand. In the list as given here, we therefore venture to place these families in a more natural series than that in general use. We use the momenclature of South's list, except in the case of the "Eggars" which cannot be rightly known as *Bombycidæ*, when the type of *Bombyx—B. mori*, the Common Silkworm Moth—belongs to a quite different family.

SATURNIIDÆ.

Saturnia pavonia, L.—Generally distributed; often common.

SPHINGIDÆ.

Acherontia atropos, L.—Generally distributed, but not common.

Sphinx convolvuli, L.—Generally distributed; common in some years.

[**S. ligustri**, L.—Limerick, Ballymena—records doubtful.]

Deilephila galii, Schiff.—Has occurred twice on the coast of Co. Dublin.

D. livornica, Esp.—Has occurred near Youghal, Killarney, Ennis, Kingstown, Kildare, Trim, and Belfast.

Chœrocampa celerio, L.—Has occurred in Co. Sligo.

C. porcellus, L.—Generally distributed; often common, especially near the coast.

C. elpenor, L.—Generally distributed; often common, specially inland.

Smerinthus ocellatus, L.—Local:—Cos. Fermanagh, Armagh, Dublin, Wicklow, Westmeath, Limerick, Galway, Waterford, and Clare.

S. populi, L.—Common everywhere.

S. tiliæ, L.—Co. Galway.

Macroglossa stellatarum, L.—Generally distributed; common in warm summers.

M. bombyliformis, Ochs.—Widespread, but local; sometimes abundant:—Cos. Donegal, Antrim, Monaghan, Tyrone, Roscommon, Galway, Sligo, Westmeath, Dublin, Wicklow, Cork, and Kerry.

NOTODONTIDÆ.

Dicranura furcula, L.—Local; sometimes abundant:—Cos. Derry, Donegal, Cavan, Mayo, Galway, Westmeath, and Dublin.

D. bifida, Hb.—Rare:—Cos. Derry and Sligo.

D. vinula, L.—Common everywhere.

Stauropus fagi, L.—Once near Kenmare.

Ptilophora plumigera, Esp.—Once at Clonbrock, Co. Galway.

Pterostoma palpina, L.—Local and rare:—Cos. Tyrone, Cavan, Wicklow, Galway, and Kerry.

---

[1] T. A. Chapman "On . . . the Pupæ of Heterocerous Lepidoptera . . ." *Trans. Ent. Soc.*, 1893.

[2] G. F. Hampson, "The Fauna of British India. Moths," Vol. 1, 1892.

Lophopteryx camelina, L.—Generally distributed; larvæ often common.

Notodonta bicolor, Hb.—Killarney.

N. dictæa, L.—Not common:—Cos. Antrim, Derry, Dublin, Wicklow, Westmeath, Sligo, Mayo, and Galway.

N. dictæoides, Esp.—Local, but more abundant than the last:—Cos. Donegal, Cavan, Tyrone, Roscommon, Mayo, Westmeath, Dublin, and Wicklow.

N. dromedarius, L.—Widely distributed and common in Cos. Derry, Donegal, Tyrone, Dublin, Wicklow, Westmeath, Sligo, Mayo, and Galway.

N. ziczac, L.—Widely distributed and common, in same counties as the preceding; also Armagh.

N. trepida, Esp.—Co. Wicklow.

N. chaonia, Hb.—Co. Wicklow; Killarney; Clonbrock, Co. Galway.

N. trimacula, Esp.—Killarney.

Phalera bucephala, L.—Common everywhere.

Pygæra curtula, L.—Rare:—Larvæ in Cos. Down, Roscommon, Galway, and Tipperary.

P. pigra, Hufn.—Widely distributed and common:—Cos. Donegal, Tyrone, Leitrim, Down, Westmeath, Mayo, and Galway.

CYMATOPHORIDÆ.

Thyatira derasa, L.—Generally distributed, but not often abundant.

T. batis, L.—Generally distributed; sometimes common.

Cymatophora or, Fb.—Very local and rare:—Cos. Derry, Cavan, Sligo, Galway, and Wicklow.

C. duplaris, L.—Local, and not common:—Cos. Derry, Donegal, Tyrone, Monaghan, Cavan, Fermanagh, Westmeath, Wicklow, Sligo, Mayo, Galway, Cork, and Kerry. All Irish specimens are referable to the var. *argentea*, Tutt.

C. fluctuosa, Hb.—Very rare:—Cos. Sligo and Kerry.

LASIOCAMPIDÆ.

Trichiura cratægi, L.—Killarney.

Pœcilocampa populi, L.—Widely distributed; locally common.

Eriogaster lanestris, L.—Local:—Cos. Derry, Galway, and Kilkenny.

Clisiocampa neustria, L.—South of Ireland; local:—Cos. Dublin, Waterford, Killarney, Limerick, Clare, and Galway. Also at Enniskillen.

Lasiocampa rubi, L.—Common everywhere.

L. quercus, L.—Has occurred only at Queenstown and in Co. Westmeath.

var. **callunæ,** Palm.—Common everywhere.

Odonestis potatoria, L.—Generally distributed, and locally common.

LYMANTRIIDÆ.

Leucoma salicis, L.—Co. Galway.

Dasychira fascelina, L.—Bog of Allen, King's Co.

D. pudibunda, L.—South of Ireland; local, but sometimes common:—Cos. Wicklow, Waterford, Cork, Kerry, and Galway.

Orgyia antiqua, L.—Widespread, but local, and not often common.

(TO BE CONCLUDED).

PROCEEDINGS OF IRISH SOCIETIES.

Royal Zoological Society.

Five Lion-cubs were born in the Gardens on August 10th. All are males, an absolutely unique circumstance, and are doing well. Three Capybaras were also born in the Gardens on September 4th. Recent donations comprise a pair of Red-striped Lizards and some Japanese Goldfish from J. B. O'Callaghan, Esq.; two pairs of Skylarks and a Quail from C. J. Wallace, Esq.; a pair of Herring Gulls from Capt. Boxer; and a Sparrow-Hawk from R. Maunsell, Esq. Two Persian Sheep, eight parrots, and ten monkeys have been acquired by purchase.

14,600 persons visited the Gardens in August.

Belfast Naturalists' Field Club.

August 11th.—Ballymena, Slemish, and the Braid Valley were visited, the Club's usual good fortune in weather being in evidence all day. Arriving at Ballymena, the party was met by Mr. W. J. Knowles, M.R.I.A., and the Rev. George Buick, local members, who gave much assistance throughout the day. No time was lost in mounting the vehicles and driving through the town, going by the old road past Drumfane Fort to Broughshane, stopping at the esker to examine the sands and gravels. The current-bedding is here finely displayed owing to recent weathering; the softer strata have been taken full advantage of by the Sand-martins, which have burrowed in and made their nests in great numbers. The next halt was made at the pretty little church of Broughshane, to the east of which is the cross-marked grave of the Club's late President, Rev. Canon Grainger, whose kindly welcome and local information were much missed on this, the first occasion of the Club's visit to "Canon Grainger's country" since his demise. The slopes of Slieve Mis (1,437 feet) were soon reached, and its pleasant heights ascended. This is an old volcanic neck, and from its vent doubtless partly flowed that basalt which forms such a prominent feature of our County Antrim surface. At Ballyligpatrick, between Skerry and Slieve Mis, St. Patrick, then a captive youth, herded the flocks of the chieftain Milchu for seven years, and here it was he dreamed those dreams and saw the visions which were subsequently to be realised. The descent from the hill having been made, a pleasant drive brought the party to the ancient Church of Skerry (Sciric), situated on a rocky eminence, as its name denotes. Formerly "stations" were held here, and great crowds assembled round what is known as "St. Patrick's foot-mark," a small depression in an adjoining rock. Close by is the Holy Well called Tubernacool (pronounced *sool*), which Colgan styles "fons miraculosus." In this district were found the pretty flower *Gentiana campestris*, and several roses, including the rare *Rosa Sabini* and other interesting plants. The return journey was then made to the Adair Arms, where tea was partaken of, after which the members visited the valuable collection of antiquities belonging to Mr. Knowles, and the fine Parish Church, on the invitation of the rector. Belfast was reached at nine o'clock, bringing back all satisfied with their pilgrimage to the scenes of the early labours of Ireland's patron saint.

Dublin Naturalists' Field Club.

August 11th.—Excursion to Lucan. A party of about twenty proceeded to Lucan Station by 10 o'c. train from Broadstone. Arrived there, the banks of the Canal were immediately invaded, and carefully examined as far as Leixlip, and they yielded a good harvest to the collectors. The most note-worthy plants which grew in the waters or on the margins or slopes adjoining were *Ranunculus Lingua*, *R. circinatus*, *Nuphar luteum*, *Senebiera Coronopus*, *Epilobium palustre*, *Valeriana officinalis* and *Lythrum salicaria* in great quantity, *Sium angustifolium*, *Œnanthe phellandrium*, *Œ. fistulosa*, *Origanum vulgare*, *Linaria minor* (on the railway), *Typha latifolia*, *Sagittaria sagittifolia*, *Equisetum Wilsoni* abundant, *Chara hispida* f. *rudis*, *C. aspera*, *C. vulgaris*, *C. contraria*, *C. polyacantha*. Near Leixlip *Carduus crispus* and *Reseda lutea* were observed on dry banks, and *Gymnadenia conopsea* and *Parnassia palustris* in a marshy meadow. At Leixlip the party visited the Salmon Leap, near which huge specimens of *Scrophularia aquatica*, some 8 or 9 feet high, were gathered. Thence the route lay down the river bank, through the woods of Lucan demense. *Orobanche hederæ* was found in immense abundance and great luxuriance under the trees by the river bank, and an adjoining pool was fringed with *Carex pendula*, and *Orchis pyramidalis* grew among the grass.

This is usually a very unproductive month for Coleoptera, but thanks to the luxuriant growth of vegetation a few interesting plant-feeding species were taken, numbers of the local *Galerucella nymphææ* occurred on the water-plants in one place near Lucan, *Cassida equestris* (a species widely distributed but local), *Apion Gyllenhali*, *A. carduorum*, etc., *Sitones flavescens*, *S. lineatus*, *S. tibialis*, *Ceuthorrhynchus pleurostigma*, *C. erysimi* and *C. litura*, the last mentioned very common on thistles. The Hemiptera were more plentiful, the best being *Lygus rusticus*, *Nabis flavomarginatus*, *Pithanus Maerkeli* and *Calocoris roseomaculatus*, but the "take" of the day was a single specimen of *Myrmedobia tenella*, Zett., on the Canal bank near Lucan, a species which had not been previously known as Irish, and in England is only known to occur in a very few localities.

Under a spreading Oak tree at the lower end of the demesne Miss Gardiner had an ample tea spread upon the sward, to which full justice was done. Subsequently, a short business meeting was held, Mr. David M'Ardle in the chair, when the following new members were elected—Mrs. Stewart Baskin, Miss M'Intosh, B.A., Miss R. Mahaffy, Miss E. Reynell, Major Gamble, Mr. G. F. Gamble. The party returned to town by the 7.5 steam tram.

Limerick Naturalists' Field Club.

June 28th.—Excursion to Lough Gur and neighbourhood—a locality some twelve miles south of Limerick, justly celebrated for its geological characteristics, and the richness and great variety of its archæological remains. Time did not permit a careful examination of the district, the most interesting botanical find being Henbane (*Hyoscyamus niger*), a fine specimen in full bloom having been gathered by Mrs. R. Gibson.

August 6th.—Excursion to Broadford, Co. Clare, one of the very few fine days of the month. The marshy meadows and peat bogs skirting Doon Lake yielded Marsh Epipactis (*Epipactis palustris*), Spotted Orchis (*Orchis maculata*), Marsh Parnassia (*Parnassia palustris*), Yellow Loosestrife (*Lysimachia vulgaris*), Water Mint (*Mentha aquatica*), Gipsywort (*Lycopus europæus*), Marsh Thistle (*Carduus palustris*), Sundew (*Drosera rotundifolia*), Reed Mace (*Typha latifolia*), Bur-reed (*Sparganium ramosum*), Lichen Cornutus (*Cladonia coccifera*), &c., &c. Larvæ of the Pebble Prominent Moth (*Notodonta ziczac*), and pupæ of the Bullrush Moth (*Nonagria arundinis*) formed the most interesting entomological records of the day.

NOTES.

ZOOLOGY.

INSECTS.

Vespa arborea (austriaca).—Further Records.—I captured a queen of this species about the middle of last July, in the nursery garden, Monkstown, and another was taken, somewhat earlier, by Mr. Freke at Dundrum. Both Mr. Freke's specimen and mine were taken in company with *V. sylvestris*. The identity of our *V. arborea* with the Continental *V. austriaca* can only be fully confirmed by the discovery of the male. The best way to secure this would seem to be by examination of the nests of *V. sylvestris*, if, as seems probable, *V. arborea* be really an inquiline species inhabiting the nests of the former.—H. G. CUTHBERT, Blackrock, Dublin.

Cimbex femorata, Linn. in Co. Dublin.—Examination of the British Museum collection has convinced me that the male Cimbices taken by Mr. J. J. Dowling (p. 176), are remarkably large examples of this species, and neither *C. connata*, nor American immigrants as I at first supposed. Mr. Dowling has kindly written to inform me that the insects were taken at Foxrock, not at Stillorgan.—GEORGE H. CARPENTER.

The Brown Hairstreak (Thecla betulae) in County Wexford.—In Mr. Kane's list of Irish Lepidoptera, Munster and Galway are mentioned as this rare British Butterfly's Irish habitats. It is an insect of annual occurrence in Killoughrim Forest, Co. Wexford, from which locality I sent Mr. Kane a male and a female in 1889. Mr. Kane, in his reply, was good enough to inform me that they were the only Irish specimens of *Thecla betulae* he had seen: so the omission of Co. Wexford from his list must be due to an oversight. I have picked up with my finger and thumb four of these Butterflies in succession while walking through the forest without a net. In some seasons, however, they are by no means so easy to obtain. Other local Irish Butterflies which frequent Killoughrim Forest and its outskirts are the Purple Hairstreak (*Thecla quercus*), Greasy Fritillary *Melitæa aurinia*), and Dingy Skipper (*Nisoniades tages*).—C. B. MOFFAT, Ballyhyland,

The small Heath Butterfly (Cœnonympha pamphilus): Single or Double-Brooded?—I cannot agree with a remark I see made in the February number (p. 44) by Mr. C. W. Watts, that *Cœnonympha pamphilus*, though regularly double-brooded in England, is in Ireland usually single-brooded. I do not doubt its being single-brooded in Ulster, but should be surprised to learn that southern observers consider it so in their districts. In Wexford it is a normally double-brooded insect, appearing about the end of May and end of July. This year the second brood was freshly out in profusion on July 30th. In 1886, however, I find August 14th noted as the date of its emergence; while in other years I have such dates as August 31st and September 8th mentioned as those on which the latest specimens were observed. The question of this Butterfly's single or double-broodedness is one on which it would doubtless interest many readers of the *Irish Naturalist* to have a comparison of notes from various districts, north, south, and midland.—C. B. MOFFAT.

The Hornet Moth (Trochilium crabroniformis, Cl.) in Co. Cork.—On July 21st while botanizing near Berehaven I captured a good specimen of this very pretty insect. Mr. Carpenter, who has kindly confirmed my determination of the species, states that it has not been previously recorded for this county.—R. A. PHILLIPS, Cork.

Coleoptera at Courtown, Co. Wexford.—On a recent trip to Courtown, Co. Wexford, Mrs. Tatlow was kind enough to collect what Coleoptera she met with during her stay. In the collection thus made are some examples of the local *Bembidium pallidipenne* taken under debris at the mouth of the river north of Courtown; there are also *Nebria complanata, Anchomenus marginalis, A. oblongus, Pterostichus vernalis, Staphylinus cæsarius* and many other species of more common occurrence.—J. N. HALBERT, Dublin.

FISHES.

The Allis Shad (Clupea alosa, L.) in the Erne.—Mr. Allingham of Ballyshannon, Co. Donegal, has forwarded me a specimen of the Allis Shad from the River Erne, with the remark that the fishermen called it a "French Herring." This species of Shad is extremely like the "Twaite Shad," which occurs chiefly in the South of Ireland—indeed, the only reliable method of distinguishing the two species is by means of the "gill rakers." These are processes projecting from the outer gill-arch, and are well seen by lifting up the gill-cover at the side of the head. In the Allis Shad, there are from 60 to 80 of these processes, whilst the other has only from 20 to 30. Both the species are in the habit of ascending rivers from the sea, in order to spawn. Although Dr. Day records their having both been obtained in Ireland, yet Thompson, in his *Natural History of Ireland*, appears to entertain some doubt whether the Allis Shad should be admitted as Irish.—R. F. SCHARFF, Dublin.

BIRDS.

American Golden Plover (Charadrius dominicus) in Ireland.—On the 12th of September, whilst examining a lot of Golden Plover which had been forwarded from Belmullet, Co. Mayo, to our Dublin market, I picked out a bird of this species, an adult, still retaining a good part of the black of the summer plumage on the breast. It differs greatly from our European bird (*Charadrius pluvialis*) in many ways, being much longer in the tarsus, the axillary feathers being smoky black (in our bird pure white), and a broad band of white over the eye. I think I am correct in saying one or two specimens have occurred in Heligoland, and one in Scotland, but the species has hitherto been undetected in Ireland.—EDWARD WILLIAMS, Dublin.

Spotted Redshank in Dublin Bay.—The Spotted Redshank (*Totanus fuscus*) is usually considered a very rare Irish bird, but from the number of times I have met the species, I should be inclined to say it is far commoner than is supposed. In the month of September, 1888, two birds passed me with a peculiar note, on the marsh at the North Bull, which I could not identify at the time, but having heard the note of the Spotted Redshank a good many times since, I have no doubt were birds of this species. In September, 1890, one was shot out of a flock of Common Redshanks at the Bull. On the 23rd September, 1891, I obtained a beautiful specimen on the marshy point in Baldoyle Estuary. October 3, 1892, I saw one at the same point, but owing to its excessive wildness, I failed to get a shot at the bird. This year, while out shooting with my friend, Mr. C. Patten, on 7th September, one passed us at about a hundred yards, just opposite Dollymount, on the North Bull. The note of the bird is a peculiar twitter, quite unlike the bold whistle of the common species, but the most distinguishing mark is the absence of the broad white bands on the wings so conspicuous in our ordinary Redshank.—EDWARD WILLIAMS, Dublin.

CONTORTED QUARTZITE, CLIFFS OF MUSLAC, ROSAPENNA, CO. DONEGAL.

From a Photograph by Mr. R. Welch.]

The Irish Naturalist.

Vol. III. NOVEMBER, 1894. No. 11.

THE BELFAST FIELD CLUB IN DONEGAL.

BY MISS S. M. THOMPSON.

In splendid weather, and just in the mood for an enjoyable tour, about forty members of the Belfast Naturalists' Field Club started for North Donegal on the 11th of last July. The Club rather prides itself upon the favour shown to it by the "Clerk of the Weather," and as even the warmest admirer of our climate could scarcely assert that the summer of 1894 was a fine season, the members had much reason to congratulate themselves upon that fortunate circumstance. True, we had one heavy shower that day during the journey from Derry to Fahan, but the train unaccountably stopped until it was over, and a member gratefully suggested that the directors wished to spare us a wetting whilst crossing Lough Swilly. Very beautiful was this passage in the special steamer chartered for the occasion, across the "Lake of Shadows," richly deserving its name as it lay basking in the varying tints and flitting lights of a most perfect summer day.

Leaving Fahan on the right hand, Buncrana with its charming golf-links soon became visible, with the grand Innishowen Mountains slumbering in the sunshine; whilst the western coast, with the strange serrated ridge of the Devil's Backbone culminating in the fine mass of Knockalla, completed a picture not soon to be forgotten. Steaming northwards, leaving Dunree Fort on the right, we presently reached the merciless quartzite rocks at the entrance of Ballymastocker Bay upon which H.M.S. *Saldanha* struck during a storm in 1811, and driving on into the bay perished with all on board. But this day Dame Nature was propitious, and the beautiful sandy shore was smiling a welcome to the hungry travellers as they reached the little Port Salon pier at two o'clock, and streamed up the lawn to the hospitable hotel.

Then came dinner, and a long delightful afternoon, as the party leisurely proceeded to visit the beauties of Fanad under the kindly guidance of the Rector, the Rev. A. H. Delap. Of course the famous Seven Arches were our first object, and very marvellous and interesting are these great sea-caves, carved by the restless waves, whose erosive power has been assisted by the natural jointing and stratification of the rock, and which are still tunnelling through long dark rifts landwards, to form yet more arches for the inspection of future Field Clubs. These Donegal quartzites were very interesting to the party, who had recently visited Scrabo, whose ripple-marked and current-bedded sandstones imitate these much older rocks, with the addition of the richly varied colouring that gives such a charm to the County Down Trias. Here too, as at Scrabo, are great intrusive dykes running through the sedimentary rocks, but in this case composed of diorite.

But a still finer sight awaited us further on, when Doagh Beg met our delighted eyes—a grand arch standing in proud isolation, seeming to defy the elements that had carved it to injure or deface their work. How indescribably subtle is the difference betwixt arch and arch, between curve and curve, that makes the one or other perfectly satisfactory to the artistic instinct, is familiar to everyone who visits a cathedral, or revels in the beauty of mountain forms! But we sat on the sunny turf, and gazed with supreme admiration at our arch, and were contented. And the landscape beyond the lough was a worthy background for this noble specimen of Nature's architecture. Innishowen peninsula lay stretched in beauty before us—the main range with Slieve Snaght and other mountains in abundant confusion, then a low sandy neck, and out to the north crouched Dunaff Head facing the Atlantic like a mighty guardian lion. Some of our party clambered round below upon the rocks, and others gathered shells, whilst Mr. Delap guided the remainder along the cliffs to obtain a view of the Binn, a vertical precipice of rock towering above the waves, said to be the finest piece of cliff scenery on Lough Swilly. Thence we turned homewards, past the boggy hollows bright with Asphodel, Bog Cotton, and the pretty little pink Pimpernel, the road winding amongst level-topped hills capped with diorite, and the characteristically different quartzite hills, until we reached St. Columba's Well.

We tasted the water, added a stone to the cairn, and noted the votive rags tied upon the bushes round the simple little fountain, sympathizing with the grateful affection that placed them on the spot hallowed by traditional memories of a great teacher.

It was nine o'clock before the hotel was reached, and we gathered in for tea in the long pleasant dining-room, decorated with a wonderful profusion of white "Bride" *Gladioli*. After tea some went off to inspect the gloomy recesses of a great sea cavern by candle-light, but most of us thought we had seen enough for one day. Some were early astir next morning to enjoy a plunge in the lough, and see the cavern by daylight, whilst a few started at six to drive along the splendid strand past the golf-links (where the exquisite view must surely interfere with due attention to that royal game), to visit a curious ridge of hardened sand in the sandhills, and inspect the beds of conglomerate that run along the foot of Knockalla Mountain. Their precise age gave rise to much discussion, but they are now declared in the Geological Survey Memoir to be Old Red, brought down by a fault into their present position. Close by are pale blue beds of highly crystalline limestone dipping at a high angle, part of a range running right across Fanad and re-appearing in the Innishowen peninsula. Returning to the Hotel we passed Col. Barton's residence, where two cannon from the ill-fated *Saldanha* do duty as gate pillars at the entrance.

After breakfast the baggage was despatched on cars to wind round the head of Mulroy Bay to Rowross Ferry, and the majority, bidding farewell to Miss Barton, started to walk to Moross Ferry on Mulroy, and cross the peninsula known as "Between the waters" to the north-west arm of the bay, where Rowross is situated. A small minority drove to Fanad Glebe, whence Mr. and Mrs. Delap conducted them to the boathouse, and they were soon gliding down the north water to see the strata of limestone on the eastern shore of "Between the waters," which are much contorted into synclinal and anticlinal curves of evenly bedded rock, sometimes only an inch or two thick. Mulroy Bay is as remarkable for its depth of 162 feet as its perplexing windings, and here where it is only half a mile in width two tiny islands of igneous rock rise out of water 150 feet deep. On the mainland a larger mass

rises to a height of 500 feet, crowned with the remains of an old fortification, from which is gained its name of Cashelmore, and close by is the cottage where Miss Patterson was born, who subsequently married Jerome Bonaparte, but was divorced by Napoleon's orders, living on to the advanced age of 93.

The scenery about Mulroy recalls the Scottish Highlands, with its tumbled masses of grey rocks, Heather, Mountain Ash, and every kind of brushwood, and Mr. Delap drew our attention to the Wood Vetch clambering and blossoming above the bushes. As we approached Moross Castle we saw the rest of the party waiting in the ferry-boat, having already examined the extraordinarily contorted schistose rocks upon which Moross Castle is built, which are puckered and frilled in leafy layers, most tempting to cameras and the hammers of amateur geologists !

Mulroy Bay is not only perplexing from its windings, also remarkable for its tidal arrangements ; even twenty-two miles from its mouth there is a rise of eight feet, whilst there is an hour's difference in high tide between the outer and inner waters. At a narrow part called the " Hasseins" the tide pouring over a kind of sill of schistose quartzite is only seven-and-a-half feet deep, and within a boat's length outside is water sixty-two feet in depth ! No wonder a special steamer had to be built to navigate such a passage as this.

Time pressed, and we were remorselessly hurried across the ferry, and traversing the peninsula " Between the waters" soon reached Rowross Ferry, crossed to Lord Leitrim's pier, and drove through Carrigart and across the sandy bay to Rossgull peninsula, lying between Mulroy and Sheephaven, where Rosapenna hotel, a picturesque Norwegian wooden structure, nestling among sandhills replete with kitchen-middens and putting-greens, was our destination.

After dinner most of the party were kindly conducted by the Rev. Father Gallagher to the ruins of Mevagh and its weatherbeaten stone cross, returning over the summit of Ganiamore (682 feet). But some of us wished to visit Sheephaven, and whilst waiting for a boat watched with much interest the embarkation of Messrs. Welch and Wilson with their cameras in a curach to photograph the contorted quartzite strata of Muslac, which Mr. Welch has kindly allowed to be

reproduced to illustrate this paper (Plate 5). A delicious breeze sent our substantial fishing boat spinning across Sheephaven and back to Downing's Pier, whence we skirted along the hills and ascended Ganiamore, where we revelled in the astonishing panorama spread before us. At last Mulroy's windings could be understood, and we gazed with great interest at our route of the forenoon and the morrow. Southward lay Lough Salt Mountain and the other Donegal giants, with Muckish leading our gaze westward to the noble cliffs of Horn Head, highest and grandest of the northern headlands, Tory Island, upon which the gunboat *Wasp* was lost in 1884, lying like a dream upon the horizon.

A rough scramble brought us down to Mevagh Church with its rude impressive cross; returning homewards we visited the inscribed stones in passing. Ice-worn and time-worn, they rise from the turf, decorated with concentric circles and patterns like the New Grange carvings, mute witnesses of a bygone race and their art.

Next morning we started for Belfast, and Donegal wept over our departure all the way to Derry. We drove from Rosapenna, across the sandhills (where some of our party had been ransacking kitchen-middens before breakfast); past the site of Rosapenna House, formerly the residence of Lord Boyne, now covered with blown sand, only the tops of the garden walls remaining visible, eighteen houses in the vicinity having suffered a similar fate. From Carrigart we turned southward, driving along the western shores of Mulroy, sometimes wild and bare, sometimes between woods carpeted with *Lastrea æmula* and other ferns—passing the spot where Lord Leitrim was murdered in 1878, over Bunlin Bridge, where the scenery is like a Canadian lake, and so into picturesque Milford, where a short halt was made for lunch at Mrs. Baxter's hospitable little hotel. Then across the rising ground, past bogs and tarns and ice-scratched rocks, to Lough Swilly, and along its western shore to Rathmullan, where another pause gave time to inspect the ruins of the castle and abbey. But the little steamer could not wait, and in dripping rain we crossed the lough to Fahan, and soon reached Derry once more. By the courtesy of Dean Smyly the cathedral was specially opened for the Club, and after visiting the historic walls the party assembled at the Northern Counties

Station for tea. Some had been left behind at Rathmullan, to revisit Port Salon neighbourhood, whilst others remained over the Sunday in Derry, but the bulk of the members returned home in the exquisite evening light, cordially agreeing that it had been a most charming and successful trip amongst enchanting scenery.

NOTES ON THE MARINE INVERTEBRATES OF RUSH, COUNTY DUBLIN.

BY J. E. DUERDEN, A.R.C.Sc. (Lond.)

THE following notes are based principally upon the material gathered on the excursion of the Dublin Naturalists' Field Club to Rush and Skerries on the 8th September, 1894. The excursion was organized for the purpose of studying the marine fauna and flora of this portion of the Dublin coast. So far, few collections have been recorded from the district. Owing to the fact that it was low water about noon, and that the party, following out the programme arranged, could not reach Rush before three o'clock, I found it desirable to go by an earlier train, and was thus collecting on the shore before the tide turned. I devoted the time to the rock-pools a little north of the harbour at Rush. Here the Upper Carboniferous Limestone crops out at a considerable angle, the direction of the strike being almost at right angles to the shore. Many rock-pools occur here. These are occupied largely by algæ, amongst which, and along the sides of the rocks, I found a moderately rich fauna. I again visited the place during the next spring tides and added a few specimens to those collected on the excursion. On this occasion I confined my attention to the rocks a little north of the martello tower.

The sides and stones in some of the rock-pools were coated with the red calcareous alga *Melobesia* and the pink *Lithothamnion polymorphum*. Many of the zoophytes, especially *Obelia* and *Flustra*, were of a bright red colour, due, as I was informed by Prof. Johnston, to the presence of *Rhodochorton membranaceum*, a red alga only recently added by him to the Irish flora. The calcareous spicules of one of the sponges examined (*Leucandra nivea*, Grant), were already attacked by

one of the minute forms of algæ which have lately been shown to perforate shells and other calcareous skeletons, and restore the lime again to a soluble form.

Amongst the PROTOZOA specimens of the arenaceous rhizopod *Haliphysema Tumanowitzii*, Bowk., were abundant, growing upon *Crisia* and *Scrupocellaria*. Professor Haddon in his report on the Fauna of Dublin Bay[1], has recorded this species from Dalkey Island, and refers to its chequered history, it having first been placed amongst the sponges, and again regarded by Hæckel as the type of a distinct class. I have previously found it abundant from Howth, growing upon *Scrupocellaria*. Some of the zoophytes were perceptibly coloured by the minute green horny sheaths of the infusorian *Folliculina ampulla*, Müll.

PORIFERA.—The sponges were abundant, coating the surfaces of the rocks, stones, and weeds. I obtained the following:—*Sycon compressum*, Auct., *Grantia coronatum*, E. & S., *Leucandra nivea*, Grant, *Halisarca Dujardinii*, Johnst., *Hymeniacidon sanguineum*, Grant, *Halichondria panicea*, Pallas, and *Dendoryx incrustans*, Esper. Of these *Leucandra nivea* is new to Co. Dublin, and, so far as I can learn, to Ireland. Small patches, encrusting the rocks, occurred at low water.

In the nomenclature of the sponges I have followed Dr. Hanitsch's Revision (*Trans. L'pool Biol. Soc.*, vol. viii., 1894, pp. 173 to 206). For the opportunity of seeing this I am indebted to Prof. Haddon, who has kindly helped me on several other matters connected with the paper.

HYDROZOA.—I obtained upwards of twenty species of hydroids, of which the following only call for notice—*Atractylis arenosa*, Alder, growing upon *Dendoryx incrustans*. This is a very minute and rare zoophyte. I have only obtained it once previously from Ireland[2]. Colonies of *Coryne vaginata*, Hincks, were abundant amongst the sea-weeds. *Campanulina turrita*, Hincks, found growing upon *Campanularia verticillata*, Linn. First found by Prof. Wyville Thompson in Belfast Lough, and described by Mr. Hincks, I have since obtained the species from different points of the Irish coast, but so far as I am aware, it has never been collected beyond Irish waters.

1. *Proc. Roy. Irish Acad.* (2), vol. iv., No. 5 (Science), p. 523.

2. Rep. on the Hydroids of the S.W. of Ireland. *Proc. Roy. Irish Acad.* (3), Vol. iii., No. 1, p. 140.

Especially abundant was the delicate *Plumularia echinulata*, Lamk., growing on quite a variety of objects.

ACTINOZOA.—On one of the ledges of rock a considerable number of specimens of *Metridium (Actinoloba) dianthus*, Ellis, were found, of the brown and white varieties. *Cylista undata*, Müll., was represented by an immature specimen. The common *Actinia equina*, Linn. was abundant everywhere. One of them has since increased my stock of anemones by six young ones. Several specimens of *Anemonia sulcata*, Penn., both the variety with iridescent green, rosy tipped tentacles, and the one with plain grey tentacles were obtained. *Bunodes gemmaceus*, E. & S., was represented by three or four young ones, while large numbers of *Tealia crassicornis*, Müll., were seen.

ECHINODERMATA.—Only two species of Ophiuroids were obtained—*Ophiothrix fragilis*, Müll., and *Amphiura elegans*, Leach.

VERMES.—Under the stones, *Lineus marinus*, Mont. was found, while *Phyllodoce viridis*, Linn., was common at low water, creeping amongst the crevices of the rocks. The arenaceous tubes of *Terebella*, and the smooth tubes of mud formed by *Sabella* were obtained, but unfortunately not the inhabitants themselves.

Of the POLYZOA I identified about thirty species. Of these the following are recorded in the Brit. Assoc. List as being rare in Co. Dublin :—*Eucratea chelata*, Linn., *Bicellaria ciliata*, Linn., *Cribrilina punctata*, Hass., *Valkeria uva*, Linn., and *Pedicellina cernua*, Pall. *Schizoporella unicornis*, Johnst., is new to Co. Dublin. It has only been previously recorded for Ireland from Antrim. This is the first time *Alcyonidium mytili*, Daly, has been mentioned for Ireland, though considering its abundance in Dublin Bay and elsewhere around the Irish coasts, it has probably been passed over for some of the other species of the genus. It is very probable that the *Sarcochitum polyoum*, of Hassall[1], obtained from Dublin Bay growing on *Fucus* shells and stones, belongs to this species.

MOLLUSCA.—Of the Nudibranchs, I obtained several specimens of the beautiful *Eolis coronata*, Forbes, upon the lower part of the stems of *Halidrys siliquosa*. Also a single example of *Eolis exigua*, Ald. and Hanc. This minute species has previously been recorded for Co. Dublin by Prof. Haddon, from Kingstown Harbour.

[1] *Ann. Nat. Hist.*, vol. vii., p. 484.

CRUSTACEA.—Amongst the Amphipods, *Caprella linearis*, Linn., was in considerable abundance, looping about amongst the weeds and zoophytes. In similar places the Isopod *Idotea tricuspidata*, Desm., occurred abundantly. Two smaller forms, *Dynamene rubra*, Leach., and *D. viridis*, Leach., were plentiful on the *Fuci*. They are about one-fifth of an inch in length, and are often found together. They are both new to the fauna of Co. Dublin. Mr. Thompson has taken the former at Bangor, and the latter at Lahinch in Co. Clare. The edible crab, *Cancer pagurus*, Auctt., and the common shore crab, *Carcinus mœnas*, Leach., were collected. The smooth rocky floors of some of the pools formed a convenient battle-ground for small hermit crabs, *Eupagurus bernhardus*, Fabr. Overturning the stones rewarded one as usual with numbers of *Porcellana platycheles*, Linn., and *P. longicornis*, M. Edw.

The PYCNOGONS collected were handed over for determination to Mr. G. H. Carpenter, and he has kindly returned me the following list:—*Nymphon rubrum*, Hodge, *Pallene brevirostris*, Johnst., *Phoxichilidium femoratum*, Rathke, *Anoplodactylus petiolatus*, Kr. This species is new to the east coast of Ireland. *Phoxichilus lævis*, Grube, *Ammothea echinata*, Hodge, *Pycnogonum littorale*, Str.

IRISH MOTHS.

(*Concluded from page* 220.)

ARCTIIDÆ.

Nemeophila russula, L.—West of Ireland; local, but often abundant:—Cos. Antrim, Donegal, Sligo, Galway, Cork, and Kerry.

N. plantaginis, L.—Generally distributed on heaths and bogs:—Cos. Derry, Antrim, Tyrone, Fermanagh, Sligo, Galway, Westmeath, King's, and Kerry.

Arctia caia, L.—Common everywhere.

Spilosoma fuliginosa, L.—Widespread; locally common.

S. mendica, Cl., and var. **rustica**, Hb.—Rare:—Cos. Antrim, Armagh, Dublin, Wicklow, Waterford, Limerick, Galway, and Cork.

S. lubricipeda, Esp.
S. menthastri, Esp. } Common everywhere.

LITHOSIIDÆ.

Delopeia pulchella, L.—Has occurred singly at Ardmore, Co. Waterford, and Bandon, Co. Cork.

Euchelia Jacobææ, L.—Common everywhere.

Nudaria senex, Hüb.—Once at Enniskillen.

N. mundana, L.—Generally distributed, and common.

Setina irrorella, Cl.—Cos. Mayo, Galway, and Clare.

Calligenia miniata, Forst.—Co. Galway.

Lithosia sororcula, Hufn.—Killarney.

L. lurideola, Zinck.—Galway.

L. complana, L.—Widely distributed along the coast:—Cos. Derry, Down, Dublin, Wexford, Waterford, and Cork.

L. caniola, Hb.—Very local, and it is feared extinct; formerly at Howth, Co. Dublin; Tramore, Co. Waterford.

Gnophria quadra, L.—Very rare:—specimens at Ashford, Co. Wicklow; New Ross, Co. Wexford; Lismore, Co. Waterford; and Limerick.

G. rubricollis, L.—Widespread in the south and west:—Cos. Dublin, Waterford, Galway, Cork, and Kerry.

NYCTEOLIDÆ.

Sarrothripus undulanus, Hb.—Local:—Cos. Tyrone, Westmeath, Dublin, Wicklow, Galway, Limerick, and Kerry.

Hylophila prasinana, L.—Widespread:—Various localities from Derry to Kerry.

NOLIDÆ.

Nola confusalis, H.-S.—Generally distributed.

DREPANULIDÆ.

Drepana lacertinaria, L.—Generally distributed; sometimes common.

D. falcataria, L.—Rare:—Cos. Tyrone, Mayo, Galway, and Kerry.

Cilix glaucata, Scop.—Widespread, but scarce and local:—Cos. Tyrone, Armagh, Dublin, Wicklow, Westmeath, King's, and Galway.

COCHLIOPODIDÆ.

Heterogenea limacodes, Hufn.—Clonbrock, Co. Galway.

ZYGÆNIDÆ.

Ino statices, L.—Generally distributed, and locally common.

Zygæna pilosellæ, Esp., var. **nubigena,** Led.—Cos. Galway and Clare.

Z. trifolii, Esp.—Rare:—Cos. Donegal, Fermanagh, Monaghan, Armagh, and Galway.

Z. loniceræ, Esp.—Rare:—Cos. Armagh, Galway, and Kerry.

Z. filipendulæ, L.—Generally distributed and common.

SYNTOMIDÆ.

Naclia ancilla, L.—Clonbrock, Co. Galway, two specimens only.

SESIIDÆ.

Trochilium apiformis, Cl.—Rare and local :—Cos. Dublin, Waterford, and Cork.

T. crabroniformis, Lewin—Widespread, often common :—Cos. Down, Derry, Monaghan, Westmeath, Dublin, Kildare, Clare, and Cork.

[**Sesia scoliiformis,** Bork.—Killarney—supposed larva-borings only].

S. tipuliformis, Cl.—Probably widespread :—Cos. Derry and Dublin.

S. myopiformis, Bork.—Rare :—Dublin and Cork.

S. culiciformis, L.—Rare :—Killarney, Ballinasloe, and Derry.

S. musciformis, View.—Rare :—Howth, and Saltee Islands, Co. Wexford.

COSSIDÆ.

Cossus ligniperda, Fb.—Local :—Co. Dublin, Wicklow, Kildare, Carlow, King's, Waterford, and Galway.

Zeuzera pyrina, L.
Macrogaster castaneæ, Hb. } Clonbrock, Co. Galway.

HEPIALIDÆ.

Hepialus humuli, L.—Common everywhere.

H. sylvanus, L.—Clonbrock, Co. Galway; two specimens only.

H. velleda, Hb., and var. **gallicus,** Led.—Generally distributed; often common.

H. lupulinus, L.—Co. Galway. Armagh (Rev. W. F. Johnson). Dingle (J. N. Halbert).

H. hectus, L.—Widespread, but local;—Cos. Antrim, Fermanagh, Tyrone, Westmeath, Galway, Wicklow, Cork, and Kerry.

In dealing with the butterflies, we had Mr. Barrett's completed volume on the group before us as well as Mr. Kane's list. Naturally the progress of the former gentleman's work is considerably slower than that of the latter's. We hope when Mr. Barrett's second volume is completed, to notice it, and also to review Mr. Kane's lists of *Noctuidae, Geometridae,* and remaining families as they appear. Mr. Dillon's records for the Noctuids and Geometers are already before us, and we find that in these families he has added *Moma orion, Leucania extranea, Dipterygia scabriuscula, Cloantha polyodon, Luperina cespitis, Pachnobia hyperborea, Calocampa solidaginis, Xylina semibrunnea, Pericallia syringaria, Eugonia fuscantaria, Zonosoma orbicularia, Cheimatobia boreata, Eupithecia fraxinata, E. indigata,* and *Thera juniperata* to the Irish list.

THE RECENT IRISH GLACIERS.

BY G. H. KINAHAN, M.R.I.A.

THE title of this communication may not possibly be strictly correct; however, the ice or frozen snow accumulations, to be mentioned hereafter, have already been called by the Rev. M. H. Close in his publications "corrie glaciers"; it therefore may be allowable for me to similarly classify them; also similar snow accumulations in British Columbia along the Canadian Pacific Railway are called glaciers. The latter however are permanent, lasting from year to year, while those in Ireland disappear in the summer.

When examining the west Cork hills some forty years ago, there were in the different cooms and valleys peculiar accumulations evidently in some way due to ice or its adjuncts. It is probable that, at that time, in my ignorance, a wrong origin was suggested, as it was supposed that they belonged to the Glacial period; while knowledge since gained would seem to prove that these terminal moraines may possibly be accumulating at the present day, similar to those that can be occularly proved in the Cos. Galway, Mayo, and Wicklow; possibly also in other hill districts; but the above counties are specially mentioned, as this phenomenon has been studied in them.

Chance led to the study of these glaciers in Galway and Mayo. When stationed one winter in Connemara we were snowed up for nearly three weeks, and as our supply came from Galway, all fresh meat had to be procured by the gun in the hills.

Previously to this there had been observed peculiar stacks of blocks, such as that in Glen Inagh, that rose in the centre of the valley 30 or 40 feet high; also in places on a slope below a cliff, part of the pasture would be more or less thickly sprinkled over with stones. If you asked what brought them there you were told they were "cloghsnatty" or "snow stones," but at the time the reason for the name I could not understand, not knowing Irish, and my man not being able to properly explain in English.

However, shooting in the Connemara Hills, during the big snow, explained all. In the cooms and under the high

cliffs great snow-drifts accumulated, from fifty to hundreds of feet in depth, and often from 200 to 500 or more yards wide. These drifts had certain defined limits, due to shoulders on the hill slopes that acted as groins, behind which the snow was impounded. After the snow-fall ceased, the surface of the drifts melted and froze; so that after all the snow elsewhere had disappeared, these drifts still remained, often for months. As is always the case after a severe frost, blocks and other detritus are displaced by falls when the thaw comes on; and if the fall is from a cliff over one of those drifts, the blocks and other stuff slide over it and form round its edge a terminal moraine. After a severe winter this phenomenon can be studied in the month of March, in the Co. Wicklow, at the North and South Prisons, Slieve-na-calliagh, and in the coom west of Kelly's Lough; as in these places, great and long enduring drifts form during any heavy snow-fall. These snow-drifts nearly invariably disappear in as sudden a manner as they were formed; they may last for weeks or months; but when the ground gets to a certain temperature all go at once. About the year 1870 there were great snow lakes in the valleys of the tributaries of the Ovoca; and the snow barriers all burst nearly at the one time—at mid-day early in June, flooding the whole valley and carrying away the bridges.

Those who wish to study this phenomenon should visit the hill districts when in deep snow, and thereby learn the localities of the deep and lasting drift, and afterwards visit them in the subsequent thaw, and see the stones sliding over them as they break loose.

Under a cliff on Lissoughter, Co. Galway, there was such a drift, that I was going to cross in the thaw when out shooting, but my man advised me not to do so, for although the snow was quite safe, blocks might come down; he, at the same time, pointing to a mass that he said was loose; this broke away and slid over the glacier before we left the spot. A stack of blocks in Glen Inagh over which I was puzzled led me to visit this valley at this time. Here about 200 yards from the cliff there was an isolated stack; on visiting the place in snow I found, under the nearly perpendicular cliff margining the valley to south and west, there was one of those frozen snow-drifts, while near the centre of it was a valley between the peaks called Benbawn and Bencorrbeg. Down this valley, in

the thaw, blocks shot straight over the glacier to one spot, there accumulating the stack that had so often puzzled me when shooting in the glen. In other places in these hills, those of Mayo, Donegal, &c., I have seen similar stacks, but in no places did I verify their formation but in this locality.

In the Co. Donegal, between the highlands of Kilmacrenan and Boylagh baronies, and the highlands of Barnesmore, that lies between the valleys of the Swilly and Finn, there is a comparatively low country, in which in places I saw stacks of small dimensions. Their origin interested me, and during my residence of some five or six years at Letterkenny and Ramelton I found that if there was a fall of snow in the county it was greater in this area than elsewhere, even on the hills, except Knocksnatty, east of Glenties. You could scarcely get from Letterkenny to Stranorlar on account of the snow-drifts, while you could drive anywhere through the Northern Highlands.

Snow-drifts in the Donegal Highlands while I was there were not as marked features of the hills as those in the Co. Wicklow, but there was one large drift to the north-east of Errigal, over which, during the thaw, the quartzite detritus slid, and has formed at its margin a massive esker-like high accumulation of shingle. In this county, between Falcarragh and Gweedore, there is, in the valley through which the road runs, a peculiar ridge of large blocks, which I suspect must be due to a snow-drift under the cliff to the westward; this, however, I was not able to verify while I was in this county.

On the flat between this valley and the sea south of the Bloody Foreland, there is an irregular curved line of blocks, or rather there is a tract without blocks, and a tract with blocks; the blocks becoming more frequent as you approach the curved marginal line. The reason for this was familiar to me—the slope in some years was covered with frozen snow, over which stones from the high ground slide, when the thaw commenced. This I had previously studied in the Cos. Wicklow and Wexford, especially at Ballinsillog, on the slope north-east of Croaghan Kinshallagh, near the boundary of the two counties. When this slope was visited there was scarcely any snow on it, but what had been there had melted and frozen and was a sheet as slippery as glass. Over this stones were sliding, from the size of eggs to over half a hundred-weight,

the escarpment above not breaking up in large pieces. At the beginning of the thaw the detritus ran down all the way to the wall between the pasture and the tillage, but as the ground melted they stopped on the pasture, so that, when the frost was gone, they had to be carted off. There was a tradition in the place that in old times no rent was to be paid for the townland if there were snow after the first of March.

In my description in the Memoirs of the Geological Survey of the drift of the mountainous districts examined by me, various ridges and stacks of blocks will be found mentioned, the origin of which I could not then satisfactorily state or even suggest. This is specially the case in the low, but hilly granite ground, between Galway Bay and the valley from Clifden to Oughterard.

Experience, however, teaches, and after seeing what took place in the Co. Wicklow during a winter of heavy snow, the origin of such ridges and stacks dawned on me. Subsequently I saw in the cuttings of the Canadian Pacific as it crossed the Rockies, in the Kicking Horse Pass, well-exposed sections of these snow-drifts and névé marginal remains. What is to be seen there is most instructive, as it fully explains our Irish recent glaciers. At the time of my visit to the "Foot Hills" of the Rockies the snow-drifts were gone for the season, but the terminal moraines were there, being more or less similar to the Irish ones; higher up in the Rockies the drifts and their moraines were intact, so that the railway cuttings exposed good sections. My visit to Canada was so short that my conclusions can scarcely be of much value. Yet it was long enough to explain points in the Irish drift phenomena previously inexplicable.

While stationed in the Co. Cork I had a rare opportunity, during an exceptionally hard winter, of studying the recent ice and glacier work, but unfortunately I did not avail myself of it, but ran out of the county and did not return till March. It was not till I went to Connaught that I saw what I ought to have previously seen; and subsequently, on all occasions, when in the vicinity of hills, they were visited in the snow and thaw. Anyone interested in the phenomena could not do better than spend a week or fortnight at Fogarthey's Hotel, Drumgoff, Glenmalure, as he would be within an easy tramp of the summit of Slieve-na-gollian, and from it study the peculiarities of snow-drifts. He should go up the valley to

the pass, then south along the ridge to the summit of Slieve-na-Culliagh, and return eastward by Kelly's Lough. An inquirer, however, would have to pay at least two visits; one during the snow-fall and at least one after the general snow had gone and only the drifts remained. Glendalough of St. Kevin's does not appear to be a good centre, as I went there in heavy snow and frost when all the lakes were frozen over, but was disappointed in getting information as to the results of the drifts.

PROCEEDINGS OF IRISH SOCIETIES.

Royal Zoological Society.

Recent donations comprise a pair of Toads from Rev. S. A. Pelly, a Cockatoo from Rev. J. E. Moffat, and a Snake from R. B. Hall, Esq. A Red Deer fawn has been born in the Gardens, while two Ostriches, two Black-backed Jackals, two Hyæna-Dogs, a large Baboon, three Monkeys, a Lemur, and two Bull-frogs have been purchased.

Belfast Naturalists Field Club.

August 25th.—Excursion to Dundrum, attended by a party of over fifty. Proceeding by the 9.15 train, the first point of interest was the fine Anglo-Norman castle, which rises above the town; its principal features were described by the President (Mr. F. W. Lockwood). The ruined church of Maghera, and the cromlech and pillar-stone at Slidderyford, were subsequently examined. The party then proceeded to the sandhills, where the fine raised beach and overlying traces of pre-historic human habitation claimed attention. On the dunes the botanists gathered the Meadow Rue (*Thalictrum minus* v. *dunense*), Hound's-tongue (*Cynoglossum officinale*), Sea Spurge (*Euphorbia paralias*), and Sea Holly (*Eryngium maritimum*). The members partook of tea at the Downshire Arms hotel, and returned to Belfast by the evening train.

Dublin Naturalists' Field Club.

September 8th.—Excursion to Rush and Skerries. A party of forty-five members and friends took the 1.30 train from Amiens-street to Rush. On the walk from the station to the shore some plants were found, including Viper's bugloss (*Echium vulgare*), Flixweed (*Sisymbrium sophia*), Scale Fern (*Ceterach officinarum*), Wild Mignonette (*Reseda lutea*), Tansy (*Tanacetum vulgare*), Bugloss (*Lycopsis arvensis*), while some members who examined a stretch of sand-dunes lying a little to the south, got in addition a number of remarkably large specimens of the pretty Hare's-foot Trefoil (*Trifolium arvense*), two feet in height, and a few plants of the Black Mustard (*Sinapis nigra*) and of Sea Purslane (*Atriplex portulacoides*). Passing through the village of Rush, the route lay northward along the shore, where the highly-inclined and vertical beds of Carboniferous limestone, projecting into the sea in long ridges, excited the interest of the geologists of the party. On the low cliffs and steep banks grew abundance of Samphire (*Crithmum maritimum*) and Sea Lavender (*Statice occidentalis*). Here also the Field Woundwort (*Stachys arvensis*), a plant very rare in County Dublin, was obtained. From the Martello Tower a beautiful view was obtained, embracing the mountains of Dublin, Wicklow, Down, Louth, and Armagh, and the lower grounds

of Meath; and a glorious prospect of blue sea, on which thousands of sea-birds were busily engaged in fishing. The rock-pools were explored by Mr. J. E. Duerden, and his results appear in a paper in our present issue. Mr. H. K. G. Cuthbert collected beetles, and obtained the following species:—*Dromius meridionalis*, *Ocypus morio*, *Philonthus laminatus*, *Stenus guttula*, *Astilbus canaliculatus*, *Lema lichenis*, *Halyzia xviii.-guttata*, *Salpingus castaneus*, *Ceuthorrhynchus litura*, and *C. pleurostigma*. Among other insects obtained were the caddis-fly, *Limnophilus vittatus*, and the grasshoppers, *Stenobothrus viridulus* and *S. bicolor*. Mr. Carpenter secured the harvestman *Phalangium saxatile*, for the first time in Ireland. Soon the quaint little village of Lough Shinny was passed, and a pleasant walk through fields, where harvesting operations were in full swing, brought the naturalists to Skerries, where the Misses Gardiner had an ample repast spread in a meadow facing the sea. After tea the road was taken to the station. Near the old windmill both the Black and White Mustard (*Sinapis nigra* and *S. alba*) were observed, and abundance of Black Horehound (*Ballota nigra*), and fading twilight did not deter the botanists from detecting in the gravel pit near the station several uncommon species, such as the Long Prickly-headed Poppy (*P. Argemone*), the Blue Flea-bane (*Erigeron acris*), and the Red Hemp-nettle (*Galeopsis Ladanum*). The party returned to town by the 6.40 train, well pleased with their day's outing.

Cork Naturalists' Field Club.

August 29th.—One of the most successful expeditions of the above Club took place on this date, when a small party paid a visit to the interesting limestone caverns at the Ovens. The party, which included Professor Hartog, D.Sc.; W. H. Shaw, B.E.; T. Farrington, M.A.; D. Franklin, J.P.; H. Lund; J. H. Bennett; W. Hill; R. Blair; C. Franklin; J. Noonan, and several ladies, started by the 2 p.m. train for Kilumney Station, and after a pleasant walk reached the entrance of the caves about 3 p.m. After about three hours stay underground, during which several passages were explored, and the foundations for a plan of the caves laid, the party adjourned to the Station house, where the forethought of the ladies had provided a comfortable tea. Thence the company dispersed to travel home by road or railway.

NOTES.

BOTANY.

PHANEROGAMS.

Plants of Courtown and Arklow.—Courtown Harbour, Co. Wexford, did not appear to be so productive in the way of plants as it is with regard to insects. During a few days spent there in August, the following were noted. On the narrow belt of sandhills that fringes the coast for some miles north and south grew *Thalictrum maritimum*, *Eryngium*, *Gentiana campestris*, *Convolvulus Soldanella*, *Cynoglossum*, *Euphorbia paralias*, and *E. portlandica*, the last named being recorded from this locality in "Cybele Hibernica." *Lithospermum officinale*, and *Equisetum hyemale* grew in bushy places by the shore a mile north of Courtown. In a pool among the dunes where the river which now flows into the harbour formerly entered the sea grow *Potamogeton pectinatus* and *Ruppia maritima*—the typical form, with long spiral flower-stems and inflated sheaths. *Crithmum* is abundant on all rocky places by the sea. By the river in the demesne are *Epipactis latifolia*, *Malva moschata*, and *Stachys sylvatica* x. *palustris*—the common form, much nearer *palustris* than *sylvatica*. Between Courtown and Gorey, which is four miles inland, *Achillæa ptarmica*, *Linaria vulgaris*, and *Typha latifolia* are not uncommon.

A few plants grew on the Arklow sandhills and salt-marshes, on the extreme southern edge of Co. Wicklow, which may be worth recording. On the sandhills—*Viola Curtisii, Eryngium, Euphorbia paralias* and *E. portlandica, Convolvulus Soldanella.* In the marshes—*Sagina maritima, Œnanthe Lachenalii, Typha latifolia, Carex extensa.* In the river—*Scirpus fluitans, S. setaceus.* On roadsides—*Erodium moschatum, Chærophyllum anthriscus.* By far the most striking plant of the Arklow sandhills is the rare *Juncus acutus*, which grows in great tufts five feet high, and many yards in diameter.—R. LLOYD PRAEGER.

Artemisia Stelleriana.—Prof. Areschoug's statement (*Journ. Bot.*, 1894, p. 73), that the flowering season of this plant occurs rather late in autumn, while it may be true with regard to Scandinavia, does not quite agree as regards its behaviour in Ireland. I visited the North Bull on the last day of July of the present season in quest of this handsome colonist, to find it quite out of flower; by its appearance, it would appear to have been in full bloom about a fortnight before—say mid-July; but the species apparently flowers twice, at least in some seasons, for there was an abundant crop of new flowering stems rising up, which would bloom three or four weeks later. The plant grows on the North Bull, exactly in the position described by Prof. Areschoug as forming its habitat in Sweden—close to the sea-margin, among *Psamma arenaria*, and just above the zone of *Cakile, Atriplex*, and *Salsola.* Botanists need not go so far as the North Bull in order to acquaint themselves with the appearance of this Wormwood, as it is used as an edging to one of the beds in Leinster Lawn, and grows in the flower-border in front of Alexandra College.—R. LLOYD PRÆGER.

ZOOLOGY.

WORMS.

Bipalium Kewense (Moseley) in Ireland.—Although this remarkable species of terrestrial Planarian Worm is probably not indigenous in this country, its occurrence deserves mention, as it has made its appearance, within recent years, in quite a number of places in England. Its nearest relations live chiefly in Ceylon and China. Only two species of Planarian Worms are indigenous in Europe and in all probability will be found in Ireland, though neither of them has as yet been recorded.

Bipalium Kewense has once been obtained before in Ireland, viz. in Major Barton's greenhouses at Straffan, Co. Kildare. It was exhibited last year at a meeting of the Royal Zoological Society of London by Prof. Bell, and a second specimen has now been sent to me by Major Barton from the same locality. Like some of the slugs, it secretes a very tough slime, and I was able to observe that it suspended itself from a thread of slime, which did not break till it had reached a length of eight inches. I may mention that some excellent figures with a short description of this worm have been published by Prof. Bell in the *Proc. Zool. Soc. London*, 1886.—R. S. SCHARFF, Dublin.

INSECTS.

Hepialus lupulinus at Armagh.—On May 28th, I strolled down to Mullinure in the afternoon. Not expecting to meet with anything particular, I did not take a net with me, but merely put a few boxes into my pocket. As I was returning home, I noticed a moth flying up the lane in front of me. I made at it with my hat, knocked it down, and successfully boxed it. It proved to be a male of *H. lupulinus.* On June 1st, another specimen was brought to me by Master A. Townsend, who had caught it at Cathedral Close. Taking these captures with Mr.

Barrett's record from Galway, it would seem likely that a diligent search would produce this moth from other districts. On September 8th, I had the pleasure of adding *Orgyia antiqua* to the Armagh list, by capturing a fine male in the Mullinure meadows, when beating for *Peronea*. These last were anything but plentiful, though I managed to get a couple of nice white forms of *P. variegana*.—W. F. JOHNSON, Armagh.

Smerinthus ocellatus in West Cork.—Referring to the list of moths found in Ireland in *Irish Naturalist*, October, *Smerinthus ocellatus* was taken in the County Cork, about seven miles west of Bandon, in the month of May, 1893.—C. LONGFIELD, Enniskeen, Co. Cork.

Lithosia complana in Co. Antrim.—Early in June I took a larva on Lady's Fingers (*Anthyllis vulneraria*), at Whitehead, Co. Antrim, from which I bred a fine specimen of *Lithosia complana*. Mr. Barrett kindly confirmed my identification of the species. I believe this is the first record for the North of Ireland.—W. HOWARD CAMPBELL, Londonderry.

[Mr. Kane records the species from Co. Down.—EDS.]

Cirrhœdia xerampelina and Triphosia dubitata in Co. Dublin.—On September 6th, my brother and I had the good fortune to capture a specimen of *Cirrhœdia xerampelina* at light, and on September 27th, *Triphosia dubitata*, on a window. Mr. Carpenter, who kindly determined the species for us, believes that the former is new to the Dublin district.—G. P. FARRAN, Templeogue, Co. Dublin.

Hymenoptera of Courtown, Co. Wexford.—The following aculeates, additions to my list for the district, were taken at Courtown Harbour, last August, by Mr. Freke:—*Myrmica ruginodis*, *Pompilus rufipes*, *Vespa germanica*, *Psen pallipes*, and *Cælioxys elongata*. Two species, *Tachytes pectinipes*, and *Colletes Daviesana*, which I met with very sparingly in the locality last year, were taken by Mr. Freke in some numbers there this summer. *Pompilus rufipes* is a very local insect in Great Britain, and I cannot find any previous record of its capture in Ireland.—H. G. CUTHBERT, Blackrock, Dublin.

FISHES.

The Tunny (Orcynus thynnus, L.) in Irish Waters.—A young Tunny was obtained on the 5th October, by Sir Thomas Brady, in a mackerel net, at Baltimore, County Cork. There have only been two or three previous Irish records—only one of which was a full-grown fish. The present specimen was 4 feet long, and weighed 57 lbs. In the Mediterranean, where the Tunny is common, it frequently attains the weight of 1,000 lbs., and preserved in oil with salt as "thon mariné," is a well-known dish in France. The Tunny seems to prey on smaller fishes such as the Herring, Mackerel, and Pilchard.—R. F. SCHARFF, Dublin.

GEOLOGY.

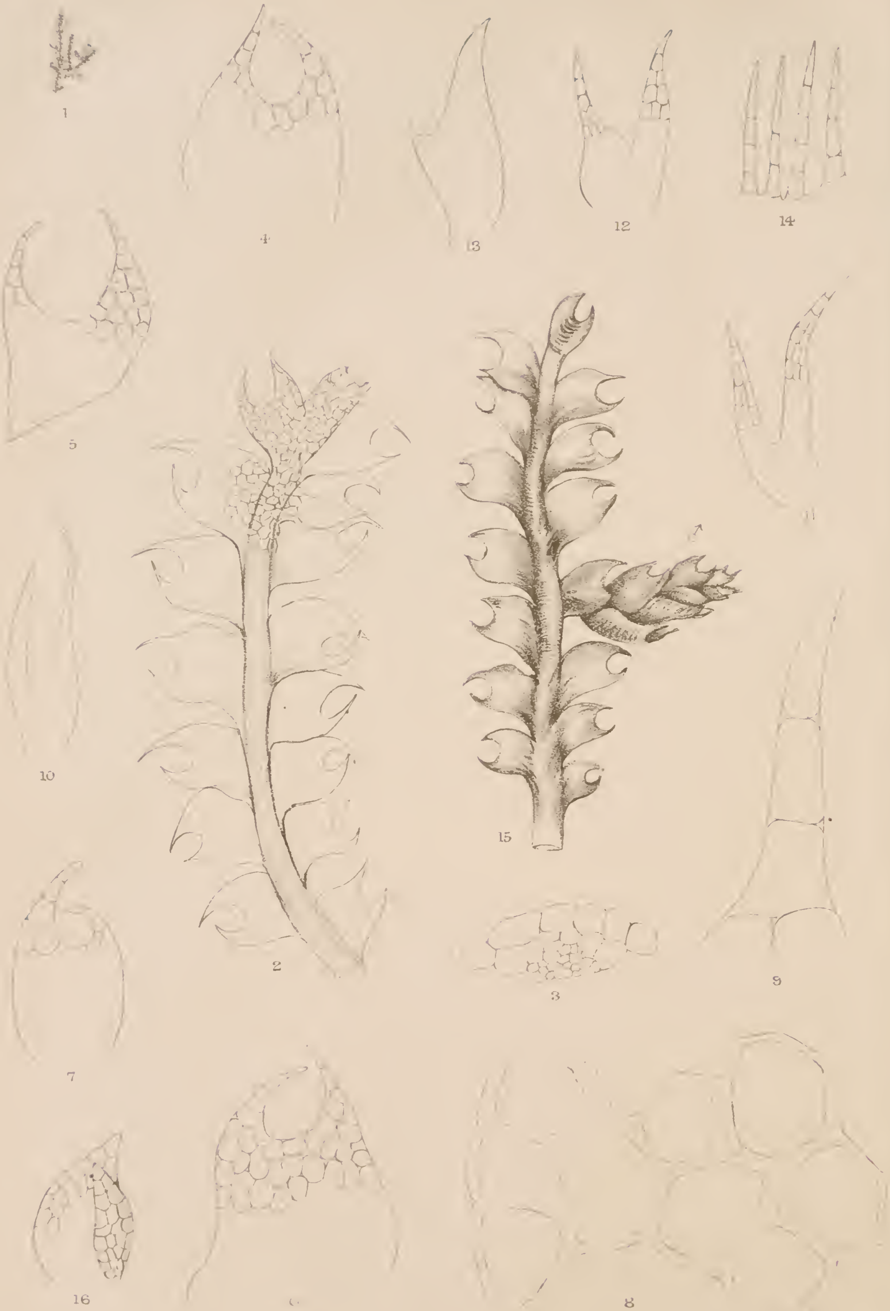
Kitchen Middens in Co. Donegal.—With reference to Mr. Kinahan's note in the *Irish Naturalist* for June, the statement that there is no pottery in the Rosapenna shell-mounds is incorrect. I do not say that there is plenty, but plenty to prove that pottery was used there. In March and in May last year, I found, in a few minutes, five or six pieces exactly like the White-park pottery, on one of the sites about 100 yards S. W. of the hotel. One of these pieces, the largest, I left with the manager for a little museum he was thinking of forming; it had the impressed ornament near the rim, that is so common on the White-park pottery also, evidently made with a twisted thong or fibre while the ware was soft.—R. WELCH, Belfast.

ARCHÆOLOGICAL BIOLOGY.

The Journal of the Cork Historical and Archæological Society.

For some time an annotated reprint of Charles Smith's quaint and interesting "Antient and Present State of the County and City of Cork" (1750), has been appearing as an appendix to the Journal of the Cork Historical and Archæological Society, and the work has now progressed as far as that portion of Book IV. which deals with the natural history of the County. The account as we read it in the original edition is clear enough, but in the reprint it is sufficiently puzzling. First comes the enumeration of the "fish" (from whales down to jelly-fishes), reprinted from the original without comment, but with a number of minor alterations in the text. Following this we find, to our great surprise, a second "Chapter V." in which the freshwater fishes are enumerated by Mr. A. G. More, F.L.S. This contribution is, we presume, a modern one, but there is not one word to show that we are not dealing with a portion of Smith's book, and that the distinguished writer of this chapter did not flourish in the middle of the eighteenth century. We next come to the birds, and here a fresh surprise awaits us. Smith's chapter is expunged *in toto*, and in its place we are presented with a full and excellent account of the present avifauna, by Mr. Ussher. At the head of this chapter we are told that it has been "re-written by Mr. R. J. Ussher, J.P.," which saves us from the danger of relegating another of our esteemed contributors to a distant period; but what connection his valuable list has with a reprint of Smith's History of Cork it is not easy to understand. Following the birds, are two paragraphs dealing respectively with the mammals and reptiles of the County. No clue is given as to their origin, but as they do not appear in the original book we presume they also are modern insertions. The amphibia are not mentioned, but on scrutiny, we find that the frog, toad, and newt have been classed among the reptiles! Next comes a useful list of land and freshwater mollusca, by Mr. R. A. Phillips—but again without a word to show that it is another recent insertion. Finally we have, in the last issued part (September), the commencement of Chapter VII., which is devoted to the plants of County Cork. This appears to us to be the best done portion of this very bewildering "reprint." The original account is reproduced (though not so exactly as might be desired) while, distinguished from the text by being enclosed in square brackets, are notes by Mr. N. Colgan, giving the modern synonymy of each plant, and remarks on its distribution.

While we would heartily welcome the appearance of a Fauna and Flora of Cork, bringing our information up to date, we do not quite know what to say to this strange jumble of ancient and modern science. One reflection occurs to us—the Archæological Society which in another hundred and fifty years reprints the present edition of Smith's "Cork" will have a difficult task in discovering which portions of the work represent the knowledge of 1750, and which that of 1894. It is to be hoped that the biologists of the future will not think that Irish naturalists, in the present year of grace, consider frogs to be reptiles, or whales "fish breathing by lungs."



B C & W lith.   Geo. Nevill del.

Cephalozia hibernica

The Irish Naturalist.

Vol. III. DECEMBER, 1894. No. 12.

A NEW HEPATIC.

BY W. H. PEARSON.

CEPHALOZIA HIBERNICA Spruce MSS.

Dioicious, creeping amongst mosses, with few rooting flagella, small, of a whitish, crystalline or pale green colour. Stems stout, flexuose, ramose, procumbent or somewhat erect, plano-convex, antical aspect 3—4 cells wide, postical with a band of 4 by 5 much smaller cells; branches postical, irregular, sometimes attenuate and gemmiparous, gemmæ capitate; rootlets hyaline, on the lower part of the stem, or at the apices of the arcuate stolons. Leaves approximate or contiguous, alternate, almost horizontally inserted, decurrent at the base, subalate, plane, so that the stem appears bialate, bifid from a third to the middle of the length, sinus rounded, segments subconnivent or erect, sharply acuminate, apical cells 2–4 in single series, texture delicate, cells large, hyaline, 4, 5 and 6-sided surface, pitted when dry as in *Ceph. connivens*, walls thick, trigones wanting. Stipules absent. Flowers (female) terminal on very short postical branches, bracts oblong, divided to about two-thirds into two unequal lanceolate-acuminate segments, subbract smaller, divided to about the middle, sometimes with a third small segment on one side, segments acute; bracteole oblong, bifid to about the middle or entire, unidentate near the middle, segments lanceolate-acuminate; subbracteole oval, divided to about $\frac{1}{4}$, segments obtuse, 3rd subbracteole small, slightly bifid. Immature perianths only met with, mouth fringed with long cilia, 12 to 15, each composed of 3 or 4 long, single cells. Androecia on short postical branches, perigonial bracts 4—5 pairs, closely imbricate, complicate-concave, oval, bilobed to about one-third; antheridia single, oval.

DIMENSIONS.—Stems ½ inch long, with leaves 1·25 mm. wide; diam. of stem, ·2 mm.; leaves, ·7 mm. by ·45 mm.; segments, ·25 mm., ·2 mm., ·5 mm. by ·3 mm.; seg., ·2 mm., ·15 mm., ·55 mm. by ·35 mm.; seg., ·2 mm., ·175 mm.; branch leaves, ·35 mm. by ·2 mm.; seg., ·15 mm., ·1 mm.; cells, ·04 mm. by ·05 mm., ·05 mm. by ·06 mm., ·04 mm. by ·04 mm.; cells of segments, ·065 mm., ·02 mm. ·05 mm. by ·03 mm.; bracts, 1· mm. by ·35 mm.; seg., ·6 mm., ·8 mm., 1·2 mm. by ·35 mm.; seg., ·6 mm., ·9 mm., bracteole, ·85 mm. by ·4 mm.; seg. ·6 mm., 1. mm. by ·4 mm.; pistillidia, ·125 mm. by ·04 mm.; perigonial bract, ·275 mm. by ·2 mm.; explanate, seg., ·075 mm.

HABITAT.—Among *Plagiothecium borrerianum*, Spruce, on banks, Killarney, Dr. David Moore, 1865. Killarney, Mr. Reginald W. Scully, 1889.

Specimens were sent by Dr. David Moore to Dr. Carrington in 1865 as *Jung. connivens*, who, recognising it as distinct from that species, brought it under the notice of Dr. Gottsche of Altona. He referred it doubtfully to *Jung. crassifolia*, Lindenb. & Gottsch. It would probably have remained unrecorded until fertile plants were found, had not a fragment of Moore's specimen been forwarded to Dr. Spruce, who at once referred it to *Cephalozia crassifolia* (L. & G.); since then he received further specimens from Killarney, collected in 1889 by Mr. Reginald Scully, and wrote to me some time before his death, that he was inclined to consider the species distinct, and proposed the MS. name of *Cephalozia hibernica*. I feel doubtful until fertile specimens have been found whether it can be separated from *Ceph. crassifolia*. In any case it is a distinct addition to our Flora.

There is a strong resemblance in habit, texture, and structure of this plant to the genus *Zoopsis*, its plano-convex stem, with the band of small cells running through it, giving it a vertebrate appearance, its remarkably plane leaves, the cells of which cross the stem unaltered. It is not difficult to trace the transition from the apparent simple ribbon-like frond of *Zoopsis argentea* (Tayl.) through *Z. setulosa*, Leitg., with its claw-like leaves, to the more perfect leaf form of *Z. Leitgebiana*, C. & P. and so to the distinctly foliose *Cephalozia crassifolia* and *Ceph. hibernica*.

It is distinguished from its nearest ally, *Ceph. connivens* (Dicks.) by its dioicous inflorescence, the longer segments of its leaves, which are composed of 2 to 4 single long cells, and other characters.

I am indebted to the late Dr. Carrington for assistance in the preparation of this paper.

DESCRIPTION OF PLATE 6.

Fig 1. Plant natural size. 2. Portion of stem, antical view × 24 (Killarney, Dr. Moore). 3. Cross section of stem × 85 (ditto). 4-6. Leaves × 64 (ditto). 7. Branch leaf by 85 (Killarney, R. Scully). 8. Portion of leaf × 290 (Killarney, Dr. Moore). 9. Portion of segment of leaf × 290 (ditto). 10, 11. Bracts × 31 (ditto). 12, 13. Bracteoles × 31 (ditto). 14. Portion of the mouth of an immature perianth × 31 (ditto). 15. Portion of male stem, antical view × 31 (Killarney, R. Scully). 16. Perigonial bract × 85 (ditto).

THE IRISH FIELD CLUBS.

BY R. LLOYD PRAEGER, B.E.,
Secretary, Dublin Nat. Field Club; Ex-Secretary, Belfast Nat. Field Club.

III.—The Cork and Limerick Naturalists' Field Clubs.

We now come to deal with the two Field Clubs which have recently been founded in the South of Ireland, and I take the earliest opportunity of acknowledging my indebtedness to their Secretaries, Mr. J. L. Copeman of Cork, and Mr. Francis Neale of Limerick, for the full information respecting their Clubs which they kindly placed at my disposal for the purposes of the present memoir. The history of these Societies is short, when compared with that of the Belfast Club, or even with that of the Field Club of Dublin—three and two years respectively, compared with thirty-two and eight years, and the exigencies of space demand that the present notice of them should be correspondingly brief. Not that we consider these young Societies one whit less important than the elder brethren in Ireland; their foundation is one of the most interesting events in the recent history of Irish science, more especially when the proximity of their head-quarters to that surpassingly attractive biological region, the extreme south-west, is considered. Irish naturalists should not only wish these Clubs every success, but, in the interests of Irish science, they should endeavour to ensure that success by whatever means lie in their power.

The foundation of the Cork Naturalists' Field Club is to be ascribed to one who still appropriately holds the office of

Secretary, Mr. J. L. Copeman, who, on 25th February, 1892, read a paper before that important local body, the Cork Literary and Scientific Society, entitled, "A Plea for a Society's Room, Field Club, and Museum." The discussion on this paper showing that some interest in the subject had been aroused, it was followed by a meeting in the Crawford Municipal Buildings, on 18th March, convened by a circular signed by Mr. Copeman, with the object of founding a Field Club in Cork. This meeting was attended by about 40 persons; resolutions were passed, approving the proposal; a code of rules, very similar to those which govern the Belfast and Dublin Clubs, was adopted, and the following officers were nominated and subsequently elected:—President, Prof. Marcus Hartog, D.SC.; Hon. Vice-President, Rt. Rev. Dr. Sheehan; Vice-Presidents, Denny Lane, M.A., W. H. Shaw, M.A., W. J. Knight, LL.D., J. Cotter, M.D.; Treasurer, John Gilbert; Curator, R. A. Phillips; Secretaries, W. B. Barrington, J. L. Copeman; with a Committee of ten Members. Rooms for meetings were obtained in the Crawford Municipal Buildings; a local museum was founded; and the Cork Field Club entered on a life which will, we trust, be a long and prosperous one. The first business meeting was held on 1st April, when the President inaugurated the first session with a "Gossip on Pond Life." The first excursion was held on 18th April, when the historic neighbourhood of Blarney was visited by some 36 members and friends; on this occasion, Mr. J. O'Sullivan made the munificent offer to hand over to the Club the whole of his large local herbarium, when accommodation was provided for its reception. During the ensuing summer and winter, a large number of excursions and indoor meetings were held. The first annual meeting took place on 17th April, when, according to the official notice sent to this Journal, the report "showed a highly creditable position." The membership stood at 89, and the financial position was good. The Officers and Committee were in most part re-elected, the only noteworthy change being the appointment of Miss Martin as a Vice-President, in place of Dr. Cotter.

The second year was quiet, but many places were visited, and a number of scientific subjects discussed, and on the whole, the interest in the Club proceedings was fairly well

maintained. The second annual report, presented to the members on 11th April, 1893, shows a membership of 50. Three winter meetings and seven excursions had been held; the very sensible suggestion is made, that one well organized meeting per month is as much as should be attempted. The want of a Club Room, and of accommodation for the Museum are referred to. The principal office-bearers were again re-elected; Mr. T. Farrington, M.A., succeeding Dr. Knight as a Vice-President. The Treasurer reported a substantial balance in hands.

Of the present year, the most important event has been the three-day excursion to Fermoy and Lismore, held in conjunction with the Dublin and Limerick Field Clubs, on which occasion the Cork Club was represented by two Vice-Presidents and the Secretary, as well as seven other members. The attendance at the other excursions has not been so large as hitherto, and the membership at present does not exceed 40, but this decrease does not necessarily signify any diminution in the Club's efficiency. While a society is new, there will always be found people who will join it, only to drop away when the novelty has worn off. Such members leave but little trace behind them, and indeed their sphere of usefulness is generally limited to the amount of their subscriptions. The Workers are more constant in their affections, and, though it is encouraging to have a larger audience before whom they may lay the result of their labours, they display none the less zeal because the circle is diminished.

Of the youngest of our Clubs, the Limerick Naturalists' Field Club, the story is soon told. It owes its origin to Mr. Francis Neale, formerly a useful entomological member of the Dublin Club. On his removal to Limerick, four years ago, he found in Mr. Joseph Stewart and Dr. W. A. Fogerty, two men whose tastes were somewhat similar to his own; and as a result of various conversations, a meeting was summoned by circular for 13th December, 1892, when the promoters brought forward their suggestion for the formation of a Naturalists' Field Club in Limerick, and submitted a simple set of rules. The meeting, which was attended by some 20 persons, adopted the suggestion therewith; Mr. Archibald Murray was appointed President; Dr. Fogerty, Vice-President;

Mr. Stewart, Treasurer; Mr. Neale, Secretary; who, with three additional members, formed the Committee. With regard to the rules, we may remark that the annual subscription was fixed at half-a-crown, being one-half of the amount which is payable in the other Irish Clubs. Twenty-two names were enrolled at this meeting; and at the end of three months the list had increased to 45. The first regular meeting took place on 17th January, 1893, when Dr. Fogerty described "Some Low Forms of Animal Life." Since that date, monthly meetings have been regularly held; the winter meetings being well attended, and decidedly successful. The summer excursions presented greater difficulties, on account of the small number of members who have taken up any definite branch of collecting; but the founders of the Club had no reason to be dissatisfied with their first season's work. The first annual meeting was held on 16th January, 1894. The statement then submitted showed that the membership was steady, and the finances in a satisfactory state. Mr. E. Taylor was elected a second Vice-President, and the Committee underwent some change. It is a matter of regret that unforeseen circumstances prevented several members from fulfilling their intention of attending the joint excursion to Fermoy, where the discussions and interchange of ideas on Field Club work would have been sure to encourage and stimulate them; but we note that, at the other excursions of the present year, the attendance has been satisfactory, and that the membership still steadily retains its original figure, about 45. Placed as they are, in the midst of a district varied and interesting, and about which there is still much to be learned, the members of the Limerick Naturalists' Field Club are certain to derive an increasing pleasure and interest from the study of local Natural History, and should not regret the day when they banded themselves together for mutual intercourse and combined study.

I have now sketched briefly the history and fortunes of the Field Clubs of Ireland. The record is a creditable one, especially when we take into consideration the lack in Ireland of a general interest in Natural History when compared with England or many parts of the Continent. Four working Clubs for over 31,000 square miles of country is certainly a very

modest allowance, but we must be content, and hope for better things to come. It may be noted that the larger Field Clubs are located on the east coast, whereas the most interesting regions for the naturalist lie along the western seaboard; the future Field Clubs of Galway and Sligo will have a glorious district for investigation lying at their very doors. Yet the eastern districts offer a wide and varied scope for the biologist, and the Clubs are steadily fulfilling their mission of investigation. The "Flora of the North-east of Ireland," the "Guide to Down and Antrim," and the "Systematic Lists," published by the Belfast Club are worthy of any scientific society, and the numerous papers which appear in these pages from the pens of Dublin Field Club members show that that Society is pursuing its appointed course. Nor have the members of the Cork and Limerick Clubs failed to contribute to the pages of the *Irish Naturalist*.

Glancing generally at the story of the Irish Field Clubs one or two facts become apparent. We note, for instance, that financial matters, the stumbling block of so many organizations, have never been a source of difficulty; the treasurer's duty has always been plain sailing, and the crux—when crux there was—has been the small number of members whose interest in natural science was sufficiently keen to induce them to support their Club by a regular attendance, by the steady pursuit of some branch of research, and by the contributing of papers at the winter meetings.

Another prominent fact is that there is often a period in the history of such Clubs, generally a few years after their foundation, when the novelty of their existence has worn off, which requires all the pluck and pertinacity of the executive to steer their ship through. We have seen that the Dublin Club passed through a most severe climax of this kind, which, fortunately, it safely weathered, and emerged into a steady prosperity. The successful and influential Field Club of Belfast also saw its evil days during early years, and though matters never assumed the critical condition that imperilled the existence of the Dublin Club, still they had up-hill work for a while. The two younger Clubs may still have difficulties of this kind before them. The rapid fall in membership of the Cork Club seems to show that there history is repeating itself; but we trust that the lowest ebb has been reached, and that Mr.

Copeman's laudable efforts will meet with the success which they deserve. The Limerick Field Club appears to be quietly pursuing its course, and it is possible that its exceedingly modest beginning may save it from the danger of a relapse.

But cannot the now successful and, one might say, powerful Clubs of Belfast and Dublin encourage and assist their southern brethren? Will their members look calmly on while these young societies fight the hard battle of life, without stretching out a helping hand? Valuable assistance they can give, and that easily; and it would be unworthy of the traditions of either Club if such aid were not tendered promptly and generously. Is it not in fact desirable in the highest degree that all the Irish Field Clubs should assist each other; that they should know each other better, and feel that they are comrades, working together for a common object; that there should exist a bond of friendly communication between them, and that as frequently as possible the members of the various Clubs shouldmeet each other? These questions have had the earnest consideration of the Secretaries of the Irish Field Clubs for some months past, and the result of their consultations will shortly assume the form of a definite proposal. It is suggested, in short, that an Irish Field Club Union should be formed, the business pertaining to which will be carried on by a committee composed of representatives of all the Clubs; that the Union should have for its objects the consideration of matters of general Field Club importance, the providing of mutual help among the Clubs, and the bringing about, by means of joint meetings and otherwise, of a closer and more frequent intercourse. Pending the general conference of the Irish Clubs, which it is proposed to hold next summer, a memorandum, embodying the above suggestions, will shortly be submitted to each Club, in order that the benefits which will arise from the Union may come into operation as early as possible. At next year's conference it is confidently anticipated that the foundations will be laid of a true and lasting Union, a bond of sympathy and friendship and scientific intercourse that will help the Clubs in their work, and stimulate them in their forward march; a Union which will be a pillar of strength to the Field Clubs, an aid to British science, and a credit to Ireland.

THE STRIDULATION OF CORIXA.

BY GEORGE H. CARPENTER, B.SC.

In the May number of the *Irish Naturalist* (p. 114), a note by Mrs. Thompson, of Cork, recorded the interesting observation that a small water-bug of the genus *Corixa* had been heard to produce two distinct sounds. One was of rare occurrence and resembled the twittering of a bird; the other, frequently heard, was a continuous shrill note, like the chirping of a grasshopper. Mr. E. Saunders, F.L.S., well known as a high authority on the hemiptera, had never heard of the power of these insects to make such sounds. Mrs. Thompson's observation was, therefore, sufficiently noteworthy, though the cause of the stridulation remained doubtful. Mrs. Thompson noticed, however, that the singing was accompanied by a motion of the front pair of legs.[1]

In view of the problem presented, it is with much satisfaction that I find that similar sounds have been recently heard by a French naturalist, M. Ch. Bruyant, from a water-bug, *Sigara minutissima*, of much smaller size than the species of *Corixa*. He believes these sounds to be caused by the motion of comb-like rows of bristles, situated upon the front feet, across the rostrum or beak of the insect. A translation of his remarks[2] may be of interest.

"The tarsus of *Sigara* is formed of a single joint—the *pala* of authors. It is simpler than that of *Corixa*. It presents the form of a somewhat irregular oval, and carries at its distal extremity a thick, stiff bristle which a high power shows to be bifid. The lateral anterior edge is armed with a series of strong, equally rigid bristles, usually as many as thirteen or fourteen in *C. minutissima*; these bristles appear to be inserted in some hollows of the integument. The lateral posterior edge, on the other hand, has only a few. . . . These strong bristles moved rapidly across the beak produce the stridulation which we have mentioned, a monotonous sound, not metallic, but exactly like that which the teeth of a comb produce by playing on the edge of a thin plate; indeed, the two instruments are present [in *Sigara*], but they are microscopic."

But M. Bruyant's paper was specially welcome in affording a reference to a similar observation upon some species of *Corixa*, thus confirming Mrs. Thompson's note. This is due to a German naturalist, Dr. Schmidt-Schwedt, who records it in a chapter on insects contributed to Dr. Zacharias' work on

[1] Mrs. Thompson has, since the publication of her note, told me that the "two appendages" therein mentioned were, doubtless, the front legs.

[2] *Comptes Rendus*, vol. cxviii., 1894, p. 299.

fresh-water plants and animals.[1] A translation of his remarks on the subject reads as follows:—

"The front pair of legs present a peculiar shovel-like appearance. Together with the beak, they act in some species (or in all ?) as a musical instrument. I have heard, only always in the evening, rather loud and continuous "music" from insects which I have kept. They remain under water, keeping the middle legs still, and fiddle on the beak with the front legs. The synchronism of the sound with the motion of the legs was clearly observed."

It will be seen that Dr. Schmidt-Schwedt records only one kind of sound, evidently the shrill note heard by Mrs. Thompson. He observed the stridulation only in the evening, while Mrs. Thompson, though finding the sound then to be continuous, heard it also at intervals during the day.

Being curious to know exactly what structures on the front legs produce the stridulation, I have made a microscopic examination of these limbs in several species of *Corixa*. There is a general tendency in aquatic insects, towards a shortening and thickening of these legs, while the intermediate and hind pairs remain relatively longer, the latter usually functioning as oars. Most kinds of water-beetles afford good illustrations of this fact. Among the water-bugs (*Cryptocerata*) we notice that in *Notonecta* the front legs are but little modified, closely resembling the middle pair. In *Nepa* and *Ranatra* these limbs are adapted for seizing prey, but in *Corixa* and *Sigara* we find them much shortened and thickened. All the divisions are stout, and the tarsus or foot consists of only a single joint. This has the shape of an irregular "half moon" (fig. 1.), whose inner or concave edge is directed downwards and inwards, in the ordinary position of the limb. This inner

Fig. 1.
Right front tibia and tarsus of *Corixa Linnei*.

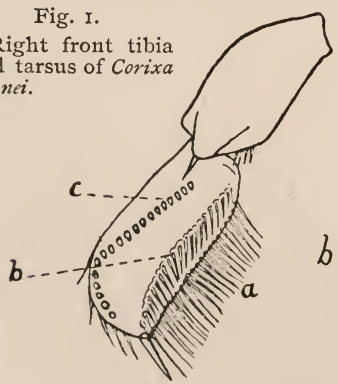
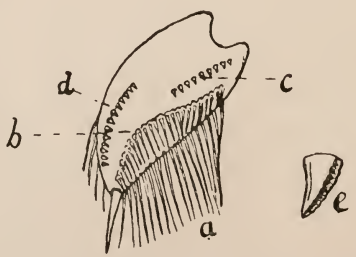


Fig. 2.
Right front tarsus of *Corixa striata*.



[1]Die Tier und Pflanzenwelt des Susswassers. Leipzig, 1891 (vol. ii., p. 114).

edge is provided with a row of numerous, closely-set bristles or cilia (fig. 1., a) while a raised keel, with another row of rather stronger bristles (fig. 1., b) runs in a curve over the inner face of the joint, both ends terminating at the inner (lower) edge. These rows of bristles, which are found on the feet of both sexes, are not, I believe, strong enough to produce the music which has been heard from the insects. But, in the males of all the species which I have yet examined, I find situated between the second row of cilia and the outer edge of the foot, a row of strong, deeply set teeth (fig. 1., c). I have no doubt that the shrill note of *Corixa* is due to the vibration of this "comb," quickly drawn across the face. A single row of teeth, like that shown in fig. 1., seems to be usually present in the males of *Corixa*. In *C. striata*, however, this has been divided into two short rows (fig. 2.), the proximal of which (c) is situated towards the middle of the inner face of the foot, and the distal (d) towards the outer edge. In most of the species, the teeth resemble blunt pegs, but in *C. striata* they are sharp and conical (fig. 2, e).

The individual *Corixa* which was heard by Mrs. Thompson, was kindly forwarded by her, but arrived in too broken a condition for specific determination. Its sex, however, was evident, and it was a male. It seems clear, from the absence of the sound-producing teeth on the feet of female *Corixæ*, that singing, in these insects, is an accomplishment reserved for the males; a similar state of things to that found in other stridulating insects, such as the cicads, which were congratulated by the ungallant poet, upon having "silent wives." The "song" doubtless serves as a call-note to the female.

Across what particular part of the face the comb is drawn, will perhaps be discovered by careful observation of living *Corixæ* in the act of stridulation. The nature of the rarer, twittering note heard by Mrs. Thompson, must also remain doubtful for the present. She noticed that, while the shrill note was accompanied by a lateral motion of the legs, the twittering was due to their upward motion. I find upon the femora a large number of irregularly arranged, stout spines, and an upward motion of the limb would bring these into contact with the edge of the face, or of the coxal cavity. Vibration set up in this way, might perhaps be the cause of the peculiar twittering sound.

PROCEEDINGS OF IRISH SOCIETIES.

Royal Zoological Society.

Recent donations comprise a Peafowl from Mrs. Prince; a white rat from Miss Lewers; a Starling and some Crayfish and Roach from P. Mahony, Esq.; a cockatoo from Miss M. Little; a Rosella from Master P. Little; three toads from Miss Nugent; a Fox from J. F. D'Arcy, Esq.; a pair of Call Ducks from S. Brunton, Esq.; numerous fresh-water fish from F. Godden, Esq.; an Indian Mynah from J. B. O'Callaghan, Esq.; and a Barn Owl from R. M. Barrington, Esq. A Llama has been born in the Gardens, while ten Curassows, six Black-headed Ibis, and three American Night-herons have been received on deposit.

We regret to have to record the death of the young female Chimpanzee.

8,600 persons visited the Gardens in October.

Dublin Microscopical Club.

October 25th.—The Club met at Mr. Hedley's, who directed the attention of the members to a thread worm about $2\frac{1}{4}$ inches in length, and stated that he had found this worm infesting the Common Earwig. He had found the nematode free in the garden soil, and had also found a nematode in hyacinth bulbs, but whether the latter and that infesting the ear-wig were identical he could not offer an opinion although there did not appear to be any macroscopic difference. The life, history and name of these nematodes he had failed to make out, although he had submitted specimens to several observers.

Mr. F. W. Moore showed *Sphœrospora binominata*, Massee, n. sp. Dr. Johnson collected at Bundoran specimens of *Jungermannia turbinata* which he forwarded to Glasnevin. When examining these, a fungus was detected growing on them, and specimens were forwarded to Mr. Massee, who made it out to be a new species and named it as above. It has not yet been described.

Mr. G. H. Carpenter showed male and female specimens of the sea-midge, *Clunio marinus*, Halid., taken at Killiney, in April, on the Dublin Field Club excursion. The insect, except for a single record from Hastings, appears to have been overlooked since Haliday took it forty years ago in Dingle and Dublin Bays. The male only was known to him. The female, which proves to be wingless, and with legs and antennæ much shorter than those of the male, was, together with a larva discovered on the same occasion, described and figured by exhibitor in the *Ent. Mo. Mag.*, June, 1894.

Mr. M'Ardle exhibited a specimen of *Lejeunea hamatifolia*, Hook., an extremely minute liverwort which was in fruit. The perianths are obovate, distinctly ribbed with five prominent and acute angles, which extend from the base to the apex, serrated, the mouth is contracted, elevated, and tubular, cut into fine sharp teeth. The specimens were collected by Mr. M'Ardle in November of last year at O'Sullivan's Cascade, Killarney, where it grows plentifully, but is very rarely seen in the fruiting condition.

June 21st.—Mr. F. W. Moore showed portion of a species of *Utricularia* bearing several bladders. The plant of which part was shown had been imported from South America, growing on a *Bromelia*. It forms thin running stems which intertwine amongst the leaves of the *Bromelia*, and bear large peltate leaves, one to two inches in diameter. At intervals,

root-like branches are given off. These are very fine, and bury themselves in the water at the base of the leaves of the *Bromelia*, on which the *Utricularia* has taken up its abode, eventually bearing numerous bladders which are covered by the water, and in which they float about fully expanded.

[The above notice of exhibit was received too late for our report of this meeting (p. 200).]

Belfast Naturalists' Field Club.

September 15th.—A party numbering 120—the largest turn-out of the season—drove from Belfast over the hills through Crumlin to Langford Lodge. The interesting historic, and other relics in the house, which was kindly thrown open by its proprietor, Rev. A. Pakenham, J.P., excited much interest. The adjoining gardens and woods were examined, after which the majority of the party proceeded by boat to Ram's Island, to inspect the round tower, &c. Tea was subsequently served on the lawn, after which the return journey was made. Very little field-work was done on this excursion.

October 26th.—The winter session was opened by the usual social meeting in the Exhibition Hall of the Royal Botanic Gardens, when there was a large attendance of members and friends, notwithstanding the very inclement weather. The upper portion of the hall had been beautifully arranged with plants and flowers, mingled with fountains and fairy lamps, by Mr. Charles M'Kimm, the curator of the Gardens, whilst the walls of the other end of the hall were covered by a collection of fern fronds, grown by Mr. W. H. Phillips, and not to be easily equalled for rarity and appearance. Tea was made by the ladies of the Club from seven till eight o'clock, when most of the company had arrived. After tea, the President, Mr. F. W. Lockwood, C.E., bade all welcome to this the annual exhibition of the Club's work, and pointed out the different exhibits. The principal one contained a collection of geological specimens, illustrating the Carboniferous formation, including some fine ornaments made from coal, lent by Mr. James Stelfox, C.E. This exhibit was under the care of Messrs. William Gray, M.R.I.A.; Joseph Wright, F.G.S.; and Alexander G. Wilson. The side walls were covered by a large collection of photographs taken during the season by the members on the Club's excursions; also, an explanatory geological series by Mr. R. Welch, and a comprehensive set of ethnographical views illustrating some of the manners and customs of the inhabitants of Ireland. Mr. John Vinycomb, M.R.I.A., with his usual taste, exhibited a lovely series of *Ex Libris*, a subject upon which he is now accepted as an authority, whilst Mr. Ernest Hanford displayed a representative series of water colours, illustrating the favourite district of Cushendall. Mr. John Hamilton excited much interest with the objects in his aquaria. Fifty rare Irish plants collected during the past season, for which a special club prize had been awarded, were exhibited by Mr. R. Lloyd Praeger, M.R.I.A. Stereoscopic views were shown by Dr. Cecil Shaw, and under the guidance of Dr. St. Clair Boyd there was a goodly display of microscopes by the members of the Club. Mrs. Allen, of Stormount Castle, exhibited a huge Tarpon, whose silvery scales attracted much admiration. Mrs. White-Spunner had on view her huge album of Irish flowering plants, which was shown at the Chicago exhibition. A lantern exhibition was given during the evening, when a series of sea-gull photos. were shown and some Club excursion views, taken by Messrs. Welch, Gray, Leslie, and MacLean. After the lantern a short business meeting was held, when twenty-five new members were elected, bringing up the total membership to about 500, the largest ever reached in the history of the Club. The president announced that Professor Cole would commence his course of lectures on "The Story of Life on the Globe" in January

next. All who intend to join the course should apply at once to Miss S. M. Thompson, the Hon. Geological Secretary, or to the Secretary of the Club.

Dublin Naturalists' Field Club.

September 29th.—The excursion season was brought to a successful close by a fungus foray to Woodenbridge, Co. Wicklow. A party of over thirty left Harcourt-street by the ten o'clock train, favoured by magnificent weather. Woodenbridge was reached at noon, and, by kind permission of Col. Bayley, the naturalists were soon dispersed through the beautiful woods of Ballyarthur.

The woods were unusually dry, in spite of the lateness of the season, and there was in consequence a distinct absence of many species which would no doubt have otherwise been taken. Moulds and the minute and more delicate hymenomycetes were not to be found. Not a single *Cortinarius* was observed, and the only Pezizoid discomycete encountered was the *Chlorosplenium* which was found in perfect fruit. Undoubtedly the best find of the day was that of *Cyathus striatus* which was detected growing on the ground by Miss Hopkins. The following complete list of fungi taken has been kindly furnished by Dr. M'Weeney, who conducted the party and identified the captures. *Hydnum repandum* L., *Clavaria cinerea*, Bull., *C. cristata*, Holmsk., *C. coralloides*, L., *C. fusiformis*, Sow., *C. contorta* Fr., *Lycoperdon* (two species), *Scleroderma vulgare*, Fr., *S. geaster*, *Phallus impudicus*, L., *Cyathus striatus*, Hoffm., *Sepedonium chrysospermum*, Lk., *Puccinia luzulae*, *Chlorosplenium æruginosum*, Tal., *Amanita muscaria*, Linn., *A. rubescens*, P., *Lepiota excoriata*, Schieff, *Armillaria mellea*, Vohl., *Tricholoma columbetta*, Fr., *Laccaria laccata*, Scop., *Clitocybe nebularis*, Batsch., *Entoloma jubata*, Fr., *Hypholoma fascicularis*, Fr., *H. sublateritia*, Fr., *Stropharia æruginosa*, Curt., *S. semiglobata*, Batsch., *Psilocybe semilanceata*, Fr., (ringed form), *Panœolus fimiputris*, Bull., *Coprinus micaceus*, Fr., *Paxillus involutus*, Fr., *Lactarius turpis*, Fr., (and two other species unidentified), *Russula emetica*, Fr., *R. ingricans*, Fr., *Cantharellus cibarius*, Fr., *Hygrophorus calyptræformis*, B. and Br., *H. chlorophanus*, Fr., *H. pratensis*, Fr., *Boletus flavus*, With., *B. subtomentosus*, Fr., *B. edulis*, Bull., *B. pachypus*, Fr., *B. scaber*, Fr.

Mr. D. M'Ardle secured the following liverworts:—*Lunularia cruciata*, Linn., *Cephalozia divaricata*, Smith *var.* (rare), *Lophocolea heterophylla*, Schrad. (very scarce), and *Trichocolea tomentella*, Erhart. This curious liverwort was gathered in some quantity by Miss Constance Pim. It occurs in almost every county sparingly, excepting Kerry, where it is often found growing in large masses. The branches are from two to four inches long, not unlike some mosses of the *Hypnum filicinum* group. The leaves are unequally two-lobed, each lobe divided and sub-divided into long ciliary fringes. The stipules or under leaves are cleft into two portions, which are fringed with cilia, giving the plant a spongiose appearance, and it is capable of imbibing large quantities of moisture. It is one of the plants selected and described by Mr. Jesse Reves in a series of articles on "Adaptation in Liverworts" in *Natural Science*, vol. iv., p. 195, March, 1894. *Diplophyllum albicans*, Linn., *Nardia crenulata* (Smith), Lindberg, and *Nardia gracillima* (Smith), Lindberg, were also taken.

Mr. Carpenter secured among beetles *Chrysomela polita*, and among two-winged flies *Tipula dispar*, Halid., an interesting crane-fly, whose female has aborted wings. Spiders were numerous, and included *Zora spinimana*, *Linyphia insignis*, *L. hortensis*, *Gonatium rubellum*, and *Lycosa lugubris*. The local harvestman *Phalangium parietinum* was also taken.

The party returned to town by the five o'clock train, well satisfied with the day's work.

October 30th.—The Club opened their eighth winter session with a successful conversazione in the rooms of the Royal Irish Academy, which were courteously placed at the disposal of the Club by the Council.

At eight o'clock the President of the Club (Mr. G. H. Carpenter, B.Sc.), who was attended by the Secretary (Mr. R. Lloyd Praeger, B.E.), took the chair, and opened the proceedings. He bade welcome to the many members and visitors present, expressing the hope that many of those who now came as visitors would soon attend as members. He referred to the success of the summer excursions of the Club, now over for the season, and especially to the important joint meetings that had been held at Drogheda in connection with the Belfast and North Staffordshire Naturalists' Field Clubs, and at Fermoy in conjunction with the Field Clubs of Cork and Limerick. Such meetings of the different clubs were sure to assist their mutual aims. He was pleased to say that arrangements were in progress for the holding of a conference of all the Irish Field Clubs next year at Galway, when they would together explore the lovely and interesting district of Connemara, and take council together regarding their mutual interests.

He then called on Mr. David M'Ardle, who showed some specimens and lantern-slides of rare Irish liverworts. These plants grew in damp places, and among moss, and many of them were of much beauty and rarity, and their distribution on the surface of the globe was very peculiar. Mr. R. Welch, of Belfast, next showed a series of lantern views from photographs taken on the recent excursion of the Belfast Naturalists' Field Club to Portsalon and Rosapenna, North Donegal; also a fine set of seagulls on the wing, taken from Southport Pier and on the Northumberland moors. Mr. Carpenter followed with photographs, by Mr. F. T. Eason, of the Irish house-spider (*Tegenaria hibernica*) and its web. A second lantern exhibition was given later in the evening, when Professor Sollas, F.R.S., showed a photograph of a model, produced by spreading a sheet of gold-leaf over a film of gelatine, and allowing the latter to dry slowly. The puckerings and cracks, and circular elevations caused by air bubbles which are produced in the goldleaf resemble in a remarkable degree the features of the moon's surface. Dr. M'Weeney exhibited a very fine series of bacilli of diseases, such as diphtheria, cholera, and tuberculosis, and explained lucidly the nature of these minute organisms. Professor Haddon subsequently described a series of beautiful views, by Mr. R. Welch, of Irish country life, illustrating the occupations, conveyances, and monuments of the people in the more remote parts of the country.

Displayed on tables in the various rooms were a large number of exhibits of scientific interest. These included microscopical preparations of the sea-midge, *Clunio marinus*, shown by the President. The male of this insect, though very rare, was known to occur in the district, but the female, which was also shown, has never been found before it was taken on the Club's excursion to Ballybrack in April last. Mr. H. K. G. Cuthbert showed an interesting set of inquiline Hymenoptera and their hosts. Mr. J. N. Halbert exhibited local insects taken in Ireland during the year, among which were several not previously found in the country. Professor A. C. Haddon, F.Z.S., showed specimens of Irish Foraminifera, and enlarged models of the same, which gave an excellent idea of the beautiful and varied shells of these minute organisms. Professor T. Johnson, D. Sc., was represented by a series of Irish sea-weeds, and some microscopical botanical preparations. Several interesting specimens from the Science and Art Museum were exhibited, including the beautiful green fungus *Chlorosplenium*, found by Miss Kelsall, and some fossil corallines from Dublin Bay, by Professor O'Reilly. Mr. F. W. Moore, F.L.S., exhibited a number of rare exotic plants in the live state, including insectivorous species. Dr. Scharff, B. Sc., contributed a collection of the land and fresh water shells of County Dublin—a very complete series; and also showed the first Irish specimens of a planarian worm, *Rhynchodesmus terrestris*. Professor Grenville Cole had on view a magnificent series of photographs taken among the higher Alps by the late W. F. Donkin; he also exhibited models and photographs illustrating

the results of earth movements. Mr. Turlough O'Brien showed a hornet's nest taken in Middlesex. Mr. R. Welch was to the fore with a good series of his well-known photographs illustrating Irish geology and ethnography. One of the principal exhibits consisted of a large table on which, amid living ferns and grasses, a large collection of fresh Fungi were naturally arranged as if growing on a green sward of mosses, each species bearing its scientific name. There were agarics of all shapes and sizes; boleti, puffballs of various kinds, hydnums and polypori. The whole exhibited a wonderful variety of form, and almost every shade of colour—greens, purples, scarlets, browns, yellows, and whites, and showed in a striking degree the variety and beauty of this class of plants. This series was collected chiefly at Dundrum and Howth by Mr. and Mrs. J. T. Tatlow, Miss C. Gardiner, and Mr. Praeger, and, considering the lateness of the season and the inclemency of the weather, it formed a very striking display of local fungi.

At 9.15 the President again took the chair, and called for nominations of new members. The Secretary read the list of nominations sent in, and the President announced that these would be balloted for at next meeting. After a further display of lantern-slides, under the management of Mr. Greenwood Pim, F.L.S., the exhibits once more claimed attention, and the members did not disperse until a late hour.

NOVEMBER 13th.—The Vice-President (PROF. COLE) in the chair. Mr. J. N. HALBERT gave an account of the insects taken on the Club's three-day excursion to Fermoy and Lismore in July last, and exhibited the specimens. This paper will shortly appear *in extenso* in our pages. Prof. Haddon, Mr. Duerden, and the Chairman complimented the reader on the industry displayed by his list of captures.

Mr. R. LLOYD PRAEGER gave a lecture on the varieties of British Ferns. He said that this group of plants exhibited an extraordinary power of variation, unequalled in any other branch of the vegetable kingdom. With the aid of numerous lantern slides and some hundreds of dried fronds, he demonstrated how in general the most extreme forms were developed by a process of regular evolution from the type, and how, in various species differing widely from each other in appearance, the types of variation run in different parallel lines. He finished with some reference to crossed varieties, and to the several interesting new modes of reproduction that have recently been discovered in certain varieties of British ferns.

Prof. Haddon, Mr. Duerden, and the Chairman criticised the paper, after which Mr. Praeger replied.

The following new members were elected :—Mrs. W. Haughton Baskin, Mrs. Bradford, Miss Brown, N. M. Falkiner, M.B., Miss E. J. Haughton, Miss K. M. N. Maguire, M.D., Mrs. Minchin.

ROYAL IRISH ACADEMY.

NOVEMBER 12TH.—Dr. R. F. SCHARFF read his report on the origin of the Land and Freshwater Fauna of Ireland. His conclusions, based chiefly on the geographical distribution of Mammals, were as follows:—That the entire fauna (except those species which originated in the country) migrated to Ireland from Great Britain in Pliocene times, and that at that time the central portion of the Irish Sea was a freshwater lake. The southern land connection between Wales and the south of Ireland broke down at the beginning of the Pleistocene system, whilst the northern one with Scotland persisted for some time after. The Irish Sea was thus converted into a marine estuary, and the freshwater fauna to a large extent driven to smaller lakes to the east and west of it. A fuller paper dealing with this highly interesting subject is promised for an early date.

NOTES.

BOTANY.

PHANEROGAMS.

Bristly Ox-Tongue in Co. Wexford.—I found *Helminthia echioides* at Kilmanock, Co. Wexford, in October, 1894. It has previously been recorded for the Co. Wexford by Mr. H. C. Hart and Miss L. S. Glascott, but is very rare. I sent a specimen to Mr. J. H. Burnill, Curator of the Cambridge University Botanical Museum, for identification.—G. E. H. BARRETT-HAMILTON, Kilmanock, New Ross.

ZOOLOGY.

INSECTS.

Asphalia flavicornis at Lough Swilly, Co. Donegal.—On 26th July, 1883, we took a larva of *A. flavicornis* on birch near Buncrana, and on 3rd August another at same place. One of them died; from the other we reared an imago, on 7th March, 1884. On 14th June, 1884, we beat another larva from birch at Rathmullen, but did not succeed in rearing it. By an editorial mistake this species was wrongly entered as *C. or* in my list of the Lepidoptera of this district (*I. Nat.*, January, 1893.) It is satisfactory to know that this moth may, therefore, be reinstated in the Irish list.—D. C. CAMPBELL, Londonderry.

MOLLUSCS.

A supposed new Species of Limax from Ireland.—Another new species of slug from Ireland is described by Mr. W. E. Collinge (*Journal of Malacology*, Vol. 3, No. 3, 1894), but although he remarks—"Anatomically there *seems* to be little doubt but that there are sufficient grounds to separate it from any other known species of the genus," yet he acknowledges that "it is a form of *L. maximus, possibly* sufficiently distinct to be regarded as another species." Before definitely adding the species to our list of Irish slugs, we must wait for further details and figures which are promised.—R. F. SCHARFF, Dublin.

Shells from Co. Donegal.—The following is a list of the shells collected by Mr. R. Welch in Co. Donegal, on the long excursion of the Belfast Field Club and at other times:—BUNDORAN: *Helix nemoralis*, type and 10,345 in about equal numbers; var. *castanea*, alive, but denuded of their epidermis by drifting sand, plentiful; var. *libellula*, one specimen; var. *hyalozonata*, with white lip (= var. *albolabiata*), two specimens. RATHMULLEN: *Helix rufescens*, two specimens of type. ROSAPENNA LINKS: *H. ericetorum*, dark form, and *H. acuta*. BOTTOM SHORE: *H. nemoralis*, type, one a pretty shell with the second band reduced to dots, = 1 : 345 band formula; *Helix ericetorum*, very fine, and mostly bandless.

Rejectamenta from PORTSALON LINKS yielded *H. pulchella, Pupa muscorum, Hyl. fulva, Carychium minimum, Coch. lubrica*, and *Vertigo angustior*. With these a good many specimens of *Rissoa striata, R. costata*, and *R. parva* occurred, and one specimen of *Lepton Clarkiæ*. Rejectamenta from BOTTOM SHORE, Portsalon, contained great numbers of *Rissoa punctura, R. striata, R. costata*, and *R. cingillus*, also many juvenile *Phas. pulla, Cerith. reticulatum, Turritella communis*, and *Trochus cinerarius*.—R. STANDEN, Manchester.

FISHES.

A new Species of Ray (Raia blanda) from Irish waters. In the *Journal of the Marine Biol. Assoc.* (n. s. vol. iii. No. 3, 1894), Mr. Holt describes a new species of Ray, which he met with first on the west

coast of Ireland. The species is now described from North Sea specimens, as a complete series of Irish examples could not be obtained at the time. *Raia blanda* is closely allied to *Raia maculata*, but is much larger and differs from it in some other important respects. The eye is smaller, the teeth are also smaller and more numerous, but the distance between the snout and the coracoid is greater in *R. blanda* than in *R. maculata*. The latter never attains anything like the same development of the asperities of the upper surface as is present in half-grown *R. blanda*.

Beaumaris Shark in Dublin Bay.—On 1st November a shark was caught just outside Dublin Bay in a trawler's net, and was exhibited at Messrs. Powell's shop, Rathmines-road. It proved to be a large specimen of the Porbeagle or Beaumaris Shark, *Lamna cornubica*. It was about seven and a half feet long, Unfortunately it was sent away to the manure works before I had an opportunity of dissecting it, but I secured one of its characteristic teeth, which are lanceolate, with a small basal cusp on each side. The Porbeagle is occasionally taken on different parts of the Irish coast. The only one I can find previously recorded from Dublin Bay was one taken in 1838, forty-five inches long, and described by Mr. William Thompson. The usual length is about four feet. They feed chiefly on fishes.—J. E. DUERDEN, Dublin.

REPTILES.

Snake Cannibalism.—Apropos of the snake-swallowing incident which recently took place, I once witnessed a similar event at the Zoo in London. Whilst watching the serpents feed I noticed two attack the same frog—they each got hold of a back leg and commenced swallowing same slowly. By and bye, the noses of the serpents met, and one gradually went into the mouth of the other. After a little while the frog escaped, but the less fortunate serpent kept on its slow movement down the throat of the other. At this point I called the keeper's attention to it; and he at once opened the cage and pulled them asunder. Neither serpent seemed any the worse, but forthwith attacked separate frogs which they duly devoured.—JAS. BRANDRETH, Dublin.

BIRDS.

Grey Phalarope (Phalaropus fulicarius Linn.) at Inch, Lough Swilly. On 26th October Mr. M'Connell shot a Grey Phalarope which he sent to me for identification. This is the only occurrence I have noted in this district since October, 1891.—D. C. CAMPBELL, Londonderry.

GEOLOGY.

The Geology of Killarney.—In a paper by Mr. C. White (*Brit. Nat.*, August and September, 1894), the scenery and geological features of the Irish lake district are ably and lucidly discussed. The writer passes in review the various rocks of the region, and shows how by upheaval, denudation, and glaciation, he believes the present features of the scene which so delight all visitors have been produced.

The Jarrow Coalfield.—Mr. T. H. Bolton contributes to the current volume of the *Trans. Manchester Geological Society* (vol. xxii., p. 613), a valuable description of plant and fish remains from this coalpit in Co. Kilkenny, figuring *Myriolepis hibernica*, a species described by Dr. Traquair. He notices that the anthracite of the region does not rest on fire-clay, but on a black shale, and concludes that it represents the overflow of a peaty lagoon.